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Euthanasia

EUTHANASIA is a fancy word derived from the Greek, which means slow, painless death. It was once used by John Maynard Keynes to describe the ultimate fate which true socialism held out for the bondholder. He spoke of the "euthanasia of the rentier."

Consider the technique of slow death for the "rentier" envisaged by the bright boys of the welfare state. The government sells its bonds with the aid of various selling pressures—patriotism, provision for the rainy day, absolute safety, instant liquidity. The banks in particular find themselves less subject to criticism by the visitorial pipsqueaks of the regulatory agencies if they increase their holdings of government bonds and correspondingly abdicate their real function of providing credit for the individual and the business of the community. A bank with all its assets in government bonds, i.e., Federal, will never get a cross word from the bank examiners.

The sale of bonds to banks has this great virtue in the eyes of the finance minister. He draws checks on the proceeds like any other borrower and the public does not realize that the government, with the collaboration of the banks, has manufactured "purchasing power" out of the whole cloth of inflation. It is a subtle form of currency depreciation with effects postponed usually beyond the office tenure of the original culprits.

The great difficulty with this seductive process of infinite debt expansion is that interest charges pile up. Payments to bondholders soon become a sizable element in the budget. Today debt service charges exceed the cost of ERP aid. What a world of good could be accomplished with the annual tribute to idle bondholders! The whole arrangement, say the liberals, is cockeyed anyway because "we owe it to ourselves."

This is where clever Keynes came in: Let the government obtain complete control of the money market so that it can determine the rate of interest paid on any kind of credit, including of course the rate on government bonds. Thereafter reduce the rate by gradual stages so that the charge in the budget remains the same even though the debt is constantly growing. (The average rate on the Federal debt in 1933 was 3.40%, as compared with 1.93% at the end of the war when the debt was 10 times as great.)

After the "rentier" has been adequately conditioned by this process, the interest burden may be entirely eliminated. To be sure, this must be done with discretion and should be accompanied by an educational campaign. It is advisable in the early stages to refund the holdings of bonds in large trust funds which do not represent earnings by the beneficiaries, in banks and corporations where bonds are held solely as liquid reserves.

It should be pointed out that in the early days of banking the owner of funds paid the bank a charge for safekeeping, a premium for the privilege of using his savings at some time in the future. Since the right to defer expenditure is still important and since a government bond gives the holder this right, "social and economic equity" would almost justify a reversal of the debt charge, with the bondholder paying the government for the privilege of holding its I O U instead of vice versa.

When the stage has been reached where bond interest vanishes, special taxes may be levied against the bondholder in upper income brackets. If the size of the public debt because of deficit financing, war, nationalization, and welfare projects becomes unwieldy, the need for "currency reform" can always be used to reduce the debt to some predetermined fraction (as in Russia at the end of 1947) and the process can start all over again.

Slick, isn't it?

Joseph Stagg Lawrence

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Time to re-live a memory?

Somewhere in every man's memory, half-hid by the veil of time, there's a scene like this. If it wasn't the thrill of catching your first fish, it might have been the day you first swam alone, or the day you first pulled the trigger of a shot gun, with somebody else shouldering the stock to absorb the kick. Exactly what it was doesn't matter. It was an unforgettable moment in your life.

Summertime makes those memories live again. A man wants to go back to those care-free, sunny days when a quick tug on the line, the old swimming hole, or a brand new fielder's glove was the only thing that mattered. So, you take a vacation. And you realize again that those simple pleasures, with the workaday world behind you, are almost as good as ever.

When you take your vacation this year remember that Ryerson stocks are again large and complete—and that service is immediate. Just tell the boys who pinch-hit for you while you're away to call our nearest plant for every steel requirement.

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► Consideration has been given to the extraction of magnesium from sea water with a pilot plant that is being built in England. Reason given for this venture is the high cost of imported magnesia used in the manufacture of refractory brick. This brick is used in basic steelmaking furnaces.

► The following statistics are believed to give some indication of manufacturers' reaction to the market for their products: 1948 automobile radio advertising was only about 150 pct greater than in 1940. But electrical appliance and household equipment advertising on radio and television was 650 pct greater than 1940. House furnishing radio advertising was about 625 pct greater.

► Latest method proposed for converting iron ore directly into steel by means of hydrogen flash reduction is that announced by Pluro, Inc., New York. Still in the laboratory stage, the technique employs purified iron oxide powder of about 325 mesh and features a newly developed centrifugal crusher design whereby suitable powder sizes are obtained.

► Some railroad specialty manufacturers are finding their new business off far more than expected. Inventory cutting is the suspected reason. Anyway, one firm believes that new business coming in is hardly up to 50 pct of shipments. This condition isn't uniform, but the average is believed close to that figure.

► By turning carbon, alloy and high cobalt-high chromium steels at temperatures in the range of 1500°F, the metal removal rate at the same power input into the lathe was increased 300 pct, 200 pct and 2000 pct, respectively. Workpiece heating was accomplished by both flame heating and by induction.

► The plus side of the current correction in the metal working field is that it had to come before any long-sustained production cycle could start. Officials who hold this view hope the correction will come quickly, clear up and make the ground work for a more stable period.

► Results of thermal tests conducted with a high purity magnesia refractory indicate that migration of relatively low-melting minerals in the brick away from the high temperature zone and their concentration in cooler zones may be one of the primary reasons for eventual failure at high temperatures. Alteration of properties resulting from this action may weaken a brick below critical limits at certain points.

► According to computations of an industry advisory group, it should be possible to set aside a very great quantity of petroleum products by rationing the civilian population on a reasonable basis in case of emergency. This can be done only if we have the steel tanks in which to store the rationed petroleum products. At present we are quite short of available tank storage.

► The mounting list of unsafe practices in the growing transportation of steel by truck has resulted in decision by the Interstate Commerce Commission to hold a meeting of steel manufacturers, motor carriers, and truck makers. ICC hopes to get all parties to voluntarily agree to cooperate to wipe out overloading and dangerous loading of steel products without resorting to formal regulations.

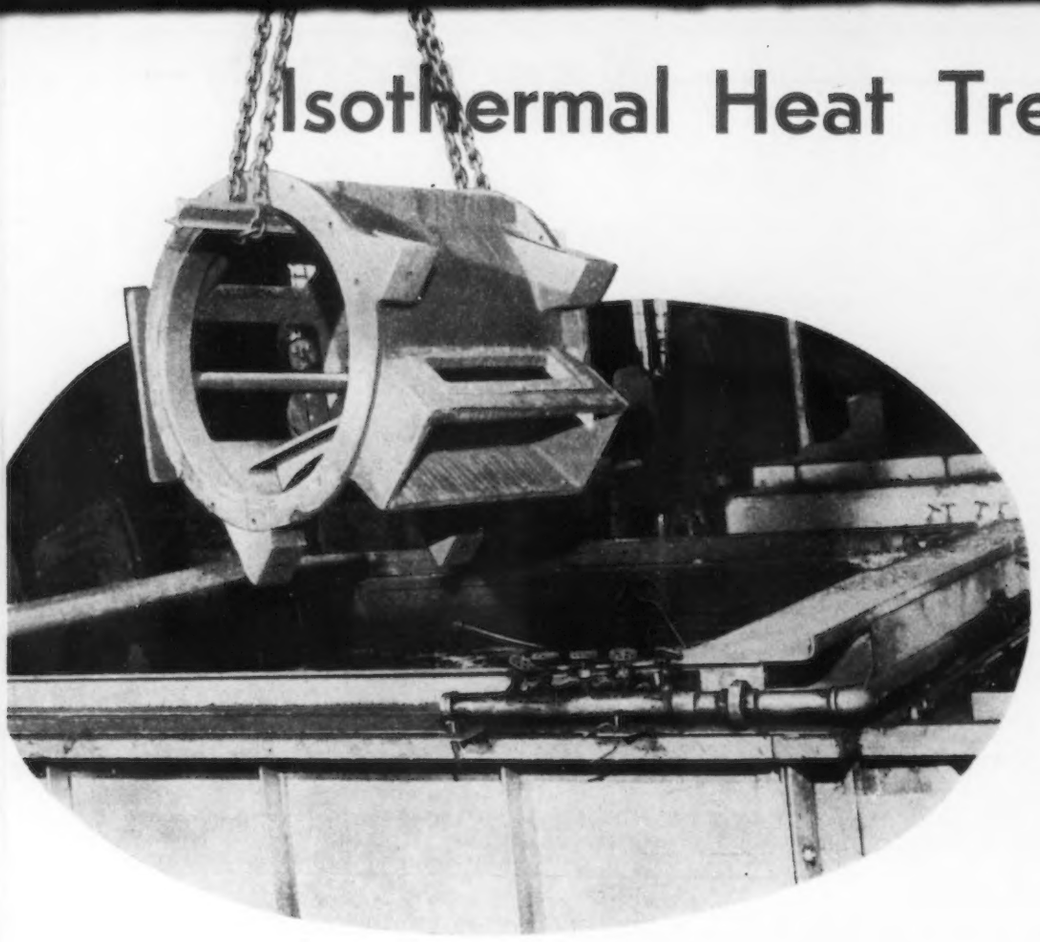
► Secretary of Commerce Sawyer has difinitely decided against asking Congress to extend the Commerce Dept. Voluntary Allocation Program. The decision marks the Federal Government's belated acknowledgment that steel supply and demand are just about in balance. Congress is preparing to give Mr. Sawyer $60,000 to liquidate the Office of Industry Cooperation by Sept. 30, 1949.

► Although engineering graduates now exceed job openings, some 100,000 new engineers will be required during the next 10 years. Death and retirement alone will require 60,000 replacements, according to Bureau of Labor Statistics. Expansion, including the mining and metallurgical fields, will offer 25,000 to 40,000 new jobs.

► Pity the steel fabricators who signed long-term contracts with "brokers" or "finders" based on paying a premium when they received extra tonnages of steel. They've received some extra, either by government or steel company action, and are now being billed a finder's fee for it.

► It is extremely unlikely that any steelmaker is planning a price cut. Certainly no one is willing to make one now. But the law of supply and demand may change the picture later this year.

Isothermal Heat Treatment



QUENCHING a large steel casting in molten salt during an isothermal heat treatment.

THE successful isothermal heat treatment of large steel castings depends upon a variety of controllable and uncontrollable factors. There is, however, one basic concept towards which such treatments must be directed, regardless of all other factors, if they are to be commercially beneficial or economically justifiable. This basic premise invariably relates to the fundamental correlation between microstructure and physical properties. Briefly stated, the premise is that the lower the temperature at which transformation products of austenite are formed, for any subsequent tempering procedure, the more desirable is the ultimate combination of physical properties attainable. While this concept is utilized with low alloy steels, it has definite application even with the carbon steels.

In the heat treatment of small steel castings (pieces weighing from 5 to 100 lb) the established practice for wrought steel parts leads to results comparable to wrought steel[1] of similar composition, providing the castings are otherwise sound. In the case of small castings, as with small wrought steel parts, a close approach to the stated basic concept is actually reached; that is, with sufficient hardenability, small castings may be cooled by quenching so that they will form transformation products of austenite throughout the entire piece at the lowest possible temperature. This lowest temperature, or preferably range of temperatures, embodies the martensite reaction, wherein the optimum combination of physical properties is realized upon subsequent tempering.

On the basis of the foregoing discussion of small castings, it seems logical to postulate that by increasing the hardenability of the steel (increasing its alloy content), large castings could also be made martensitic through proper heat treatment so that the tempered finished product could achieve the benefits derived from an optimum combination of physical properties.

This ramification is unfortunately subject to serious limitations and the metallurgical engineer is inevitably faced with a difficult decision. He must decide (1) how much can be done in the direction of producing a martensitic structure in large castings, and (2) will the accompanying difficulties be offset by the supposed benefits to be derived. Before examining the alternatives, it would be well to have some actual quantitative information illustrating the influence of the temperature of formation of austenite decomposition products on the ultimate physical properties. While the established data in this field is indeed prolific, only two examples have been taken from the literature[2] to indicate the more salient points involved.

If one considers samples of a 0.30 pct C low alloy cast steel of identical chemistry being given two different heat treatments, one in which the transformation products of austenite are formed at a lower temperature than the other, and then plots the resulting physical properties in terms

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Of Large Steel Castings

Practical limitations imposed by industrial economy introduce difficulties in meeting metallurgical requirements when heat treating large, low alloy steel castings. The resulting compromise can be determined only by a systematic investigation of the adaptability of various heat treatment cycles. Such a study is described in this article with the author presenting considerable quantitative data relating to the subject. Application of the techniques to plain carbon steel castings is also discussed.

o o o

By DON ROSENBLATT

Chief Metallurgist,
American Foundry & Machine Co.,
Salt Lake City

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of strength v. ductility for both treatments, the difference in toughness of steel for the two treatments becomes apparent.

In fig. 1 it can be noted that the value of a quenching treatment is considerable, and depending upon the end use of the castings may warrant a good deal of trouble and expense before it is discarded. While the figure points to the advantages of a martensitic structure, there are advantages in other structures, such as bainite and fine pearlite, as against higher temperature products. Although nonmartensitic structures do not show a great margin in tensile properties, the more sensitive impact tests indicate a definite superiority. In fig. 2 the effect of a lower temperature of formation of austenite decomposition products, which were not martensitic, upon the notch toughness is illustrated in terms of transition temperature. Here again, depending upon the end use, the difference for the two treatments in transition temperatures (—120° v. —80°F) is substantial enough to merit careful consideration.

In figs. 1 and 2 the effect of three distinct heat treatments is considered. Steel castings in general are given one or a combination of these treatments. Current ASTM specifications for general engineering types of steel castings cover

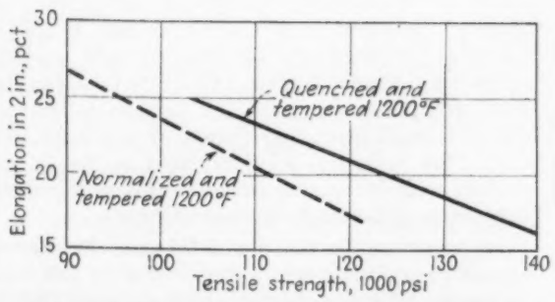

FIG. 1—Effect on physical properties of a quench and temper heat treatment as compared with a normalize and temper heat treatment on a 0.30 pct C low alloy cast steel.

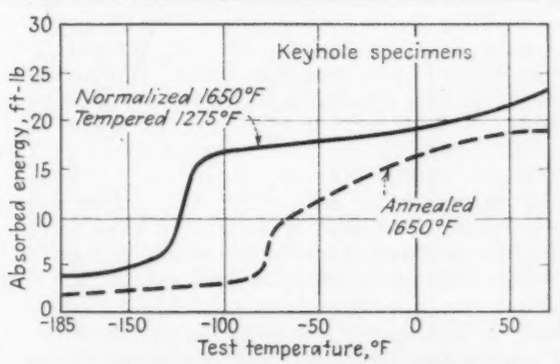

FIG. 2—Effect on toughness of an anneal heat treatment as compared with a normalize and temper heat treatment on a SAE 4630 cast steel. Solid line represents transition temperature of —120°F; broken line represents transition at —80°F.

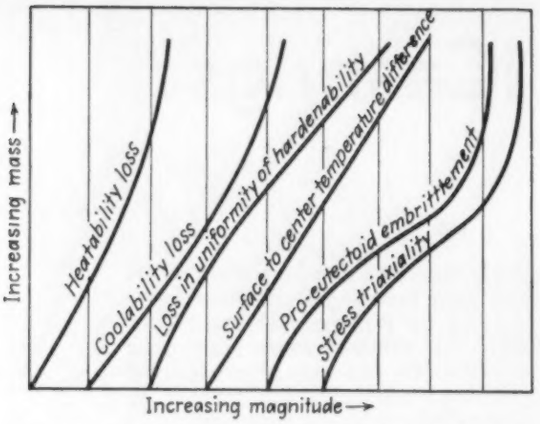

FIG. 3—Mass effect in the heat treatment of large alloy steel castings.

a tensile range of from 60,000 to 100,000 psi for carbon steels and 70,000 to 200,000 psi for low alloy steels. This range in hardness equivalent of from 120 to 400 Bhn is the range which is considered in the heat treatment of steel castings, and it should be mentioned that even at the extreme (400 Bhn), relatively high tempering temperatures may be employed to secure adequate toughness when the transformation products are formed at a low temperature and have a high pretempered hardness.

There are a variety of modified treatments which lie somewhere between the extremes presented. Between the dead-anneal and the quench and temper heat treatments, one can apply the so-called isothermal procedures. These procedures are intended to produce transformation products at controlled times and temperatures. In actual practice, however, they rarely accomplish this, but at least they approach it far more precisely than either the annealing or normalizing treatments.

The dead-anneal, which is becoming obsolete, although slow has as its chief virtue inexpensive handling and equipment requirements. While there are serious problems attending cold liquid quenching of small castings, with larger castings the problems multiply rapidly. It is for this reason that isothermal procedures are finding application in the heat treatment of large castings. Normalizing treatments, augmented by high temperature draw treatments, are very popular in most modern steel foundries today. Having an advantage over annealing, in time and end properties, together with a distinct elimination of several difficulties concomitant with cold liquid quenching treatments, they constitute the principal contender in competing with isothermal procedures in the heat treatment of large steel castings. Isothermal procedures represent a compromise between normalizing and quenching.

To arrive at an isothermal procedure by modifying a normalizing treatment in the direction of a quenching treatment, and at the same time trying to minimize the difficulties accompanying a quenching treatment, it becomes necessary to examine, at least empirically, the difficulties alluded to, and to study their mode of occurrence. Complications are best considered in the light of their behavior with increasing mass, for it is this mass effect which sooner or later defeats cold liquid quenching metallurgically as the size of the casting undergoing treatment is increased.

The most important obstacles to successful cold liquid quenching as mass increases are: *decreasing heatability, coolability* and *uniformity of hardenability,* and *increasing surface to center temperature gradients, pro-eutectoid embrittlement,* and *stress triaxiality.* These difficulties lead either to cracking, warping and nonuniformity of hardening, or to such a weakened hardening effect as to render the added expense of a quenching treatment ineffectual. *Heatability* has reference to the time required by any casting to reach the temperature of the atmosphere surrounding it when that atmosphere is at a temperature higher than that of the casting. *Coolability* changes this definition only in that it implies an atmosphere the temperature of which is lower than the temperature of the casting. It will be noted from fig. 3 that both heatability and coolability diminish at a varying rate, decreasing in magnitude at some intermediate mass, as the mass increases.

Uniformity of hardenability[3] has reference to the time-temperature-transformation curve for any portion of a casting when those portions are considered individually. If small samples were extracted from a variety of locations within a heavy casting and all showed identical S-curves when subjected to dilatometric analysis, uniformity of hardenability would be at a maximum. It may be seen from fig. 3 that with increasing mass, this property deteriorates at an accelerating rate.

Surface to center temperature difference refers to the gradients set up either in rapid heating or cooling of large castings, but particularly in cooling. This gradient increases uniformly with increasing mass, as shown in fig. 3.

Pro-eutectoid embrittlement[4] has reference to the tendency of a steel of noneutectoid composition to precipitate either carbide or ferrite at the prior austenite grain boundaries during slow cooling, thus forming an embrittling network in the casting. The hyper-eutectoid steels, precipitating cementite, constitute the more dangerous hazard. From fig. 3 it is seen that pro-eutectoid embrittlement increases rapidly to some critical point from which its further increase is gradual as the casting weight increases.

Stress triaxiality, while its occurrence is largely dependent upon casting design, is also a function of mass during heating and cooling operations where stresses generated cannot be dissipated along two axes and dangerous triaxial stresses, with attending threat of breakage, occur. This property, as illustrated in fig. 3, increases with increasing casting mass in the same manner as pro-eutectoid embrittlement.

In accretion to the six difficulties discussed, one more feature plays a major role in the heat treatment of increasingly larger castings. While fig. 3 is intended to represent empirical relationships, the added complication does not lend itself simply even to empirical portrayal. It is concerned with actual hardenability. As the alloy

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content of a casting is increased to make heavier sections hardenable, the thinner sections transform to martensite prior to the heavy ones, when the casting is subjected to a cooling medium which will produce martensite in the heavier sections. This problem is quite distinct from the uniformity of hardenability previously discussed, and it is operative even where the uniformity of hardenability may be high.

In small castings the difficulty can be overcome by martempering. In this process the initial cooling rate is great enough to produce substantially austenitic castings just above the M_s or martensite start temperature; the cooling rate is then reduced so that the forces of equilibrium operate to take the thin and heavy sections through the martensite range at about the same rate, thus eliminating excessive transformation stresses. With large castings this cannot be accomplished because even with the fastest possible cooling rate and with maximum hardenability consistent with a reasonable M_S point, the casting will only be partially austenitic just above the M_S temperature; that is, the heavier sections will have transformed in varying amounts to products other than martensite. The martempering process cannot then be effective because no matter how slowly the casting is lowered through the martensite range, differential expansion creating severe stresses will take place due to the varying amounts of available transformable austenite within the casting.

For example, in a large SAE 52100 casting being martempered, a certain heavy section may have only 25 pct available austenite to transform while an adjacent thinner section may have 100 pct austenite, so that even when uniform cooling through the martensite range takes place, the thin section is expanding while the heavy section is contracting. The composite reaction of thermal contraction in conjunction with transformation expansion is illustrated in the martensite range of SAE 52100 steel in fig. 4.

Having touched upon the major technical difficulties that must be overcome, consider again the practical shop problem of heat treating a large, low alloy steel casting, and analyze the methods available to produce a finished product with an optimum combination of physical properties under the practical limitations imposed by industrial economy. Economic considerations demand a minimum of handling operations, the shortest possible time cycles, a minimum of personnel and equipment requirements, a minimum of fuel, and a small scrap-loss risk. Metallurgical considerations demand the best physical properties, which in turn depend upon formation of austenite decomposition products at the lowest temperatures compatible with surmounting conditions which lead to failure in heat treatment. Obviously the duality of the standards by which the engineer must be guided calls for some sort of compromise.

In considering a specific casting, say an alloy locomotive engine frame, a study of the factors involved may be made to establish a suitable heat treatment, and the pattern developed may then be used as a guide in heat treating similar large castings. The casting is made of SAE 4140 steel, has a net weight of 2500 lb and varies in section from ½ to 4½ in. Specifications call for

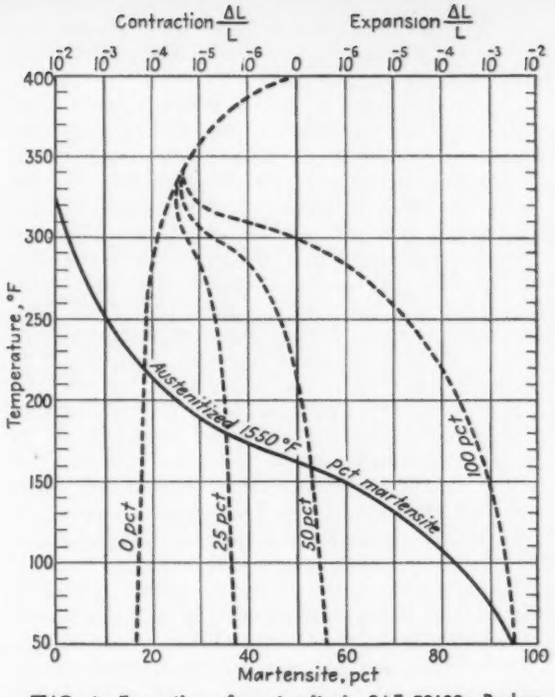

FIG. 4—Formation of martensite in SAE 52100. Broken line curves represent varying amounts of transformable product.

the following: 120,000 psi tensile strength, 100,000 psi yield point, 14 pct elongation in 2 in., 30 pct reduction of area, and 248 Bhn.

Given five such castings from a single heat of 4140, the engineer can conduct experimentation and destructive testing, and from these experimental castings must specify the most economic heat treatment which may be used in production to meet the above specifications. A location is determined for extraction of physical test specimens from each casting and also identical spots on the five castings are selected for brinell hardness tests. A systematic investigation is then possible and a variety of heat treatments may be attempted.

Typical results are given in table I, based largely on early experimental work conducted at the American Foundry and Machine Co. Machinability is compared to SAE 1010 standard of 100. The advantages of isothermal heat treatment as shown in the table make it an easy matter for the metallurgical engineer to specify the heat treatment to be used for the locomotive engine frame casting. Such a detailed study, however, is a timeconsuming project of itself and is not practical for each new type of casting received, particularly where the number of each type casting on order is small. Knowing the factors for one job as given in table I, however, makes possible the exercise of reasonably sound judgment on a wide range of similar jobs.

It should be pointed out that the isothermal procedure was determined only after a careful study of the results of the other four more standard treatments (see fig. 5). Actual practice will dictate modifications to an isothermal procedure once a job is in production and it is extremely difficult to set any hard and fast rules.

Any modifications which lead to a lower cost without impairing quality are desirable and must be constantly sought after.

In the example given, a water quench and temper proved prohibitive due to cracking and distortion, while a normalize and temper did not develop adequate yield strength and showed a wide variation in hardness. Martempering still involved a risk of quench cracking. The isothermal treatment was designed to transform the casting partially to martensite and then transform the balance of austenite to low temperature products during the simultaneous tempering of the products already formed. The nomenclature might be misleading unless the process is clarified by specifying transformation in a given temperature range, rather than at one specific temperature. At any rate, initial cooling velocity is greater than that of a normalizing treatment, so that less high temperature transformation products form and then the quantity of martensite formed is limited to an amount which will not create excessive stress. Application of the theory stated in the basic premise proves worthy as reflected in table I.

In general, the pattern for isothermal procedures will be the same; that is, to salt quench the work to some temperature near the martensite range (usually between 300° and 600°F) and then immediately replace the load into a furnace operating at the desired tempering temperature. This pattern provides better physical properties than does normalizing and tempering while preventing the cracking and distortion risk of cold liquid quenching. It also provides the shortest possible heat treating cycle and the results obtained have high uniformity.

Fig. 6 is presented as a guide to optimum salt bath temperatures to be employed in isothermal

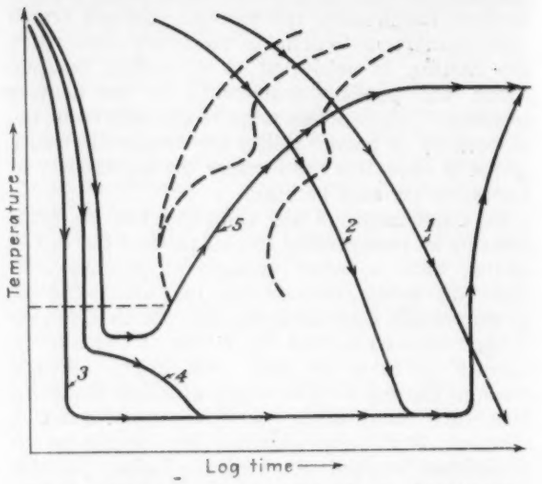

FIG. 5—Schematic diagram of the five heat treatments listed in table I; Curve 1—anneal, curve 2—normalize and temper, curve 3—quench and temper, curve 4—martemper and curve 5—isothermal.

procedures for different sizes (section) of castings. The graph was designed for use with alloy steels having an M_S of about 600°F as do most of the low alloy engineering steels.[5] The dotted lines indicate the surface-center temperature difference for various salt bath temperatures while the dashed lines indicate the time required for the center to reach the M_S. The optimum temperature is then considered to be at a point where they intersect, both being at a minimum. The smaller the section, the higher should be the salt bath temperature as shown by this graph. The graph also indicates quantitatively the magnitude of gradients which may be expected for castings

TABLE I

Comparison of Results Obtained by Five Different Heat Treatment Cycles.

	Annealed	Normalized and Tempered	Quenched and Tempered	Martempered	Isothermal
Heat Treatment	Heated to 1650° F; held for 5 hr; furnace cooled to 1000° F; air cool to 70° F	Heated to 1700° F; held 5 hr; air cooled; reheated to 1200° F; held 5 hr; air cool to 70° F	Heated to 1600° F; held 5 hr; water quenched; reheated to 1250 °F; held 5 hr; air cool to 70° F	Heated to 1650° F; held 5 hr; salt quench 400° F; cool 8 hr; draw at 1250° F 5 hr; air cool to 70° F	Heated to 1650° F; held 5 hr; salt quench 450° F; cool 30 min; reolace in furnace at 1275°F for 3 hr
Equipment used	Car type box gas oven 20 ton cap.	Car type box gas oven 20 ton cap.	Car type box elect. oven 10 ton water quench tank	Bell type gas oven 5 ton. molten salt tank 60,000 lb	Bell type gas oven 5 ton, molten salt tank 60,000 lb
Total heat-treat time, Hr	25	23	14	20	12
Man hours handling	1.5	3.0	3.5	2.5	2.0
Cracking; distortion	None	None	3 major quench cracks at section changes; distortion to 30° twist	1 major quench crack in heavy section; max distortion 5° twist	None
Bhn range	220-260	185-275	250-265	235-260	240-255
Tensile Strength, Psi	118,000	125,000	130,000	128,000	122,000
Yield Point, Psi	86,000	95,000	108,000	105,000	103,000
Elong., Pct	16	18	20	18	17
Red. Area, Pct	32	35	38	36	36
Endurance, Psi	53,000	58,000	61,000	60,000	55,000
Charpy Ft-lb (room temp.)	17	16	22	20	18
Charpy Ft-lb (−50° F)	10	13	16	16	15
Machinability	60	65	52	50	55

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of various section thickness. It must be remembered in using this chart that depending on the size of the load being quenched, the salt bath temperature will be raised from 20° to 80°F during the quenching process.

There is a wide variety of heat treating equipment which may be adapted for isothermal procedures. It has been found for batch type heat treating of loads averaging about 5 tons that an electrically-heated (cal-rods), automatically con-

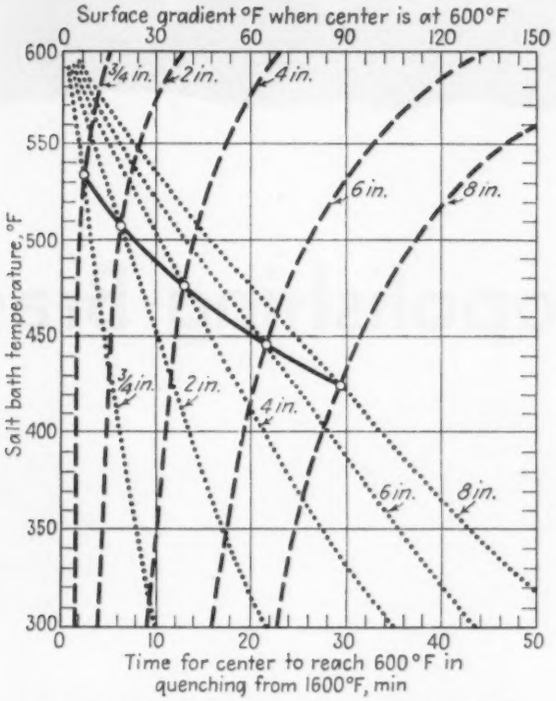

FIG. 6—Optimum salt bath temperature formula for castings of various thickness. Dotted lines indicate surface-center temperature difference for various salt bath temperatures while broken lines indicate time required for center to reach M..

trolled, air agitated, 60,000-lb molten salt bath in conjunction with a bell-type gas oven, is very satisfactory. The quench tank should be located near the furnace and the furnace should be provided with an alternate base. Handling of the load is accomplished with an overhead crane. Maintenance and power costs decrease with increasing volume and the equipment when used at or near capacity compares favorably with other types of foundry heat treat and furnace equipment, although the initial installation cost is quite high.

As mentioned earlier in the article, isothermal procedures may also be used to some advantage in the heat treatment of plain carbon steel castings. Here the principal concern is with the development of fine pearlite rather than lower transformation products, namely, bainite and martensite of the alloy castings. From fig. 7 it can be seen that an agitated salt quench having an *H* value close to that of oil would considerably shorten the time in the pearlite range over normalizing and thus a finer pearlite could be formed giving improved physical properties. Water quenching has proven impractical for many carbon steel castings due to the derived benefits being small compensation for the elaborate setup required. While carbon steel castings would not merit an isothermal installation, if the installation already exists for alloy castings, it can be used to reduce time of treatment and slightly enhance the properties of carbon steel castings and at the same time assure capacity and hence economic operation of the isothermal equipment.

Although the scope of this article has been limited to isothermal treatments, the same equipment may be employed for martempering or austempering of those castings which are deemed suitable for such operations. Large batch type treatments of small castings can be economically handled with this type of equipment, and results thus far obtained indicate a uniformity of work which equals individual or continuous oil quench operations.

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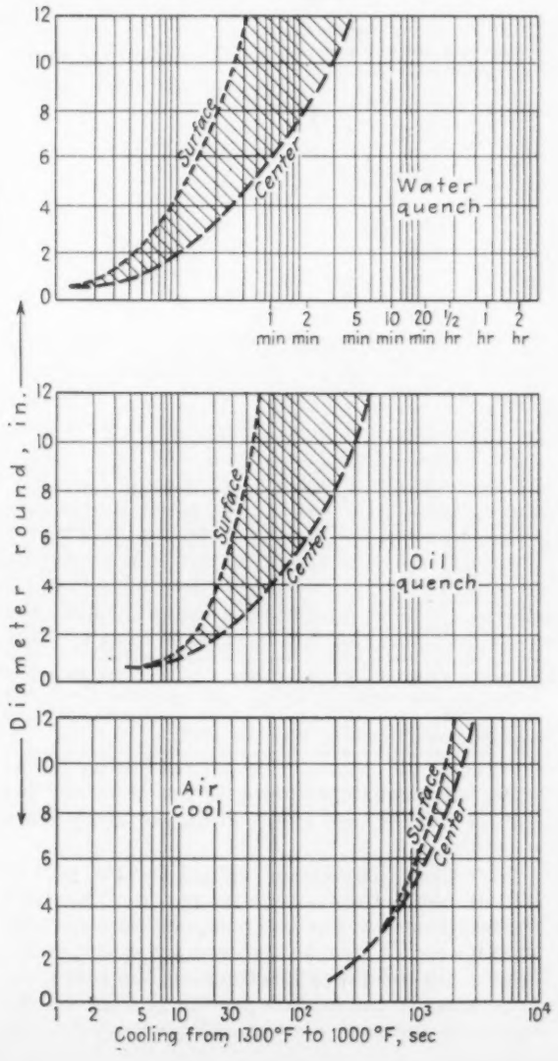
FIG. 7—Relative cooling rates in the pearlite range for a water quench, an oil quench and an air cool.



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TYPICAL brass luggage hardware which is being electropolished in quantity.

Electropolishing Brass

ELECTROPOLISHING of small irregular brass articles is commercially expedient, for a clean surface, free from abrasive or burnishing compound particles is produced.

Polishing effect has been found to be aided by the addition of certain organics to the phosphoric acid-water baths. As noted by Jacquet and confirmed by Walton*, the highly viscous film formed on the anode surface in a phosphoric acid bath is responsible for the polishing effect. Where projections extend from the metal surface, the film is thinner than average so that metal salts can be diffused away faster from the peaks; whereas in the hollows, the film is thicker and metal dissolves away more slowly.

*Paper by H. F. Walton, Univ. of Colorado, presented before the Division of Physical and Inorganic Chemistry at the 115th national meeting of the American Chemical Society, San Francisco, Mar. 31, 1949.

Several baths were developed for the polishing of small brass luggage parts. The bath presently in use has the composition indicated in table I. To this bath there are added other agents, in minor proportions, to increase the brightness of the surface produced, and, in some cases, to increase also the throwing power or ability to polish around sharply-curved surfaces or surfaces remote from the cathode. These addition agents include mannitol, amino acids such as glycine and glutamic acid, and amines such as ethylene diamine and monoethanol and triethanol amines. Glutamic acid and monosodium glutamate are perhaps preferred addition agents, in view of the increased brightness produced when a minor amount is added to the bath. These addition agents increase brightness in amounts up to a relatively low concentration, the brightness decreasing with higher concentrations.

In order to utilize the film-forming characteristics of this bath most economically, some control of the film thickness is desirable. Probably the simplest way of accomplishing this is to agitate the bath; or better still, to move the articles being polished through the bath so that a steady slip stream is caused to flow past the articles. In the baths being used, fig. 1, the wire-racked articles are rotated to provide the proper polishing action. A flow that is too rapid tends to wash off the film and hinders or prevents polishing, while a flow too slow increases the time necessary to produce the desired brightness. Very small articles (less than

An electropolishing bath and process applicable to brass and other copper alloys as well as to certain high temperature alloys is discussed by the author. Addition of organics to the bath, to promote anodic film formation, has proved the key to successful work. A simple and effective method for evaluating the reflective power of polished articles is also described.

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½ in. major diam) can often be polished without resorting to any movement in the solution, as the convection currents set up both by the heat liberated at the article surfaces and by gas evolution are usually sufficient to maintain an efficient film thickness.

A very simple and effective device for evaluating the reflecting power of polished articles has been devised by H. F. Walton. It provides a test of sharpness of definition, or resolving power, rather than actual brightness, or amount of light reflection. However, it is comparatively easy to obtain surfaces which are bright, but much harder to obtain surfaces which are free from grain and sufficiently smooth to be used as mirrors, and in this regard the test is most useful.

In the test, six parallel lines are ruled 1 cm long on a strip of card, the lines being 2 mm apart and each about ½ mm wide. The operator sits at a desk with one sample laid before him and holds the card with the lines on its underside, looking at the reflection of the lines in the surface of the sample. The card is then raised until the six lines can no longer be distinguished in the reflection but merge into a single blur. The operator reads the height of the strip above the surface on a centimeter rule held vertically. The height can be found to half a centimeter, and the test is surprisingly reproducible.

TABLE I

Bath Used in Electropolishing Small Brass Luggage Parts

Orthophosphoric Acid, 85 pct ($H_3PO_4 \cdot H_2O$)	41.5 pct
Glycerol (1, 2, 3-propanetriol)	24.9
Ethylene Glycol (1, 2-ethanediol)	16.6
Lactic Acid, 85 pct (2-hydroxy propanoic acid)	8.3
Water	8.7*

* The amount of water added is preferably that amount sufficient to adjust specific gravity to approximately 1.388, although the specific gravity may be varied between 1.386 and 1.470.

TABLE II

Brightness Obtained on Electropolishing With Varying Agitation and Bath Additives

Conditions	Reflection Limit*
No Bath Agitation	5 cm
With Bath Agitation	12
Optimum Concentration of Glutamate, With Agitation	21

* Walton Test.

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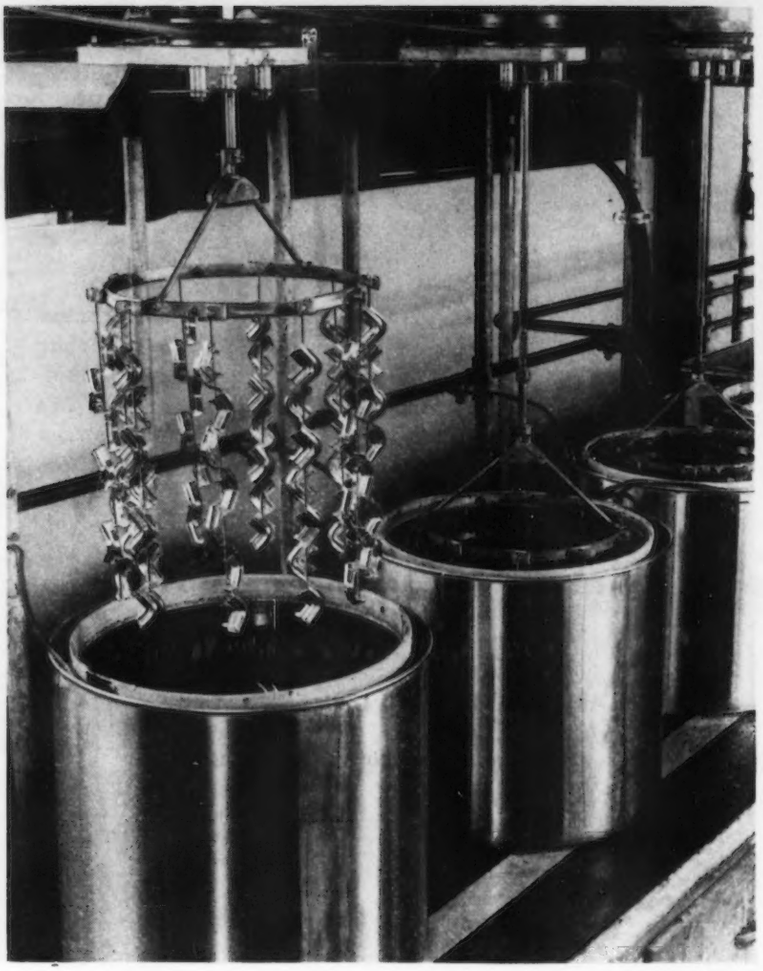


o o o

FIG. 1—At the cell in the foreground, electropolished parts are draining prior to the first wash. The two cells to the right are in operation.

o o o

Using this method of evaluating the finish obtained, 1¾x2 in. test specimens of brass plate were polished at 78° to 87°F solution temperature and at two amps per specimen current. The effect of agitation and additives was clearly shown, as in table II.

In commercial practice, the articles being electropolished by this process range in size from small hooks, used in fitting out women's luggage, through several intermediate sizes and shapes to luggage binding corners. All of these articles except the hooks are electropolished by rotating a rack loaded with from 60 to 100 parts.

The cells which contain the solution or electrolyte are so constructed that the articles cannot accidentally come in contact with the cathode. For this purpose a ceramic jar is placed within a steel tank, which is made the cathode, the ceramic jar being of a size such that a space about 1 in. wide is provided between the jar and the tank. In the space so formed, cooling coils are placed, as cooling is usually required to maintain the bath at about 98°F. This arrangement practically eliminates a troublesome condition which sometimes occurs when electropolishing in an unseparated cell; e.g., small particles of metal, which have been deposited at the cathode, break away and adhere to the polished surfaces, resulting in a stain.

Racks supporting the articles are suspended in the cells from a mechanism which rotates the rack while in the bath, fig. 2. On completion of the required electropolishing time, the rack is elevated above the bath and permitted to drain for a few seconds, then the rack is removed and washed in a first rinse from which it goes to a final hot rinse at about 150°F. The parts then are either dried for storage or go directly, in wet condition, to the varnishing or finishing operation. As the two greatest losses of the bath are the water content, through electrolytic decomposition, and other constituents, through dragout, the first rinse water is used as makeup in the cells as indicated in the diagram of the setup shown in fig. 3. In this manner total losses from the bath are held to a minimum.

All of the parts electropolished in the above operation are 70-30 brass. However, a bath of the composition given earlier will, with but minor changes in composition in some instances, produce good polishes on many other metals

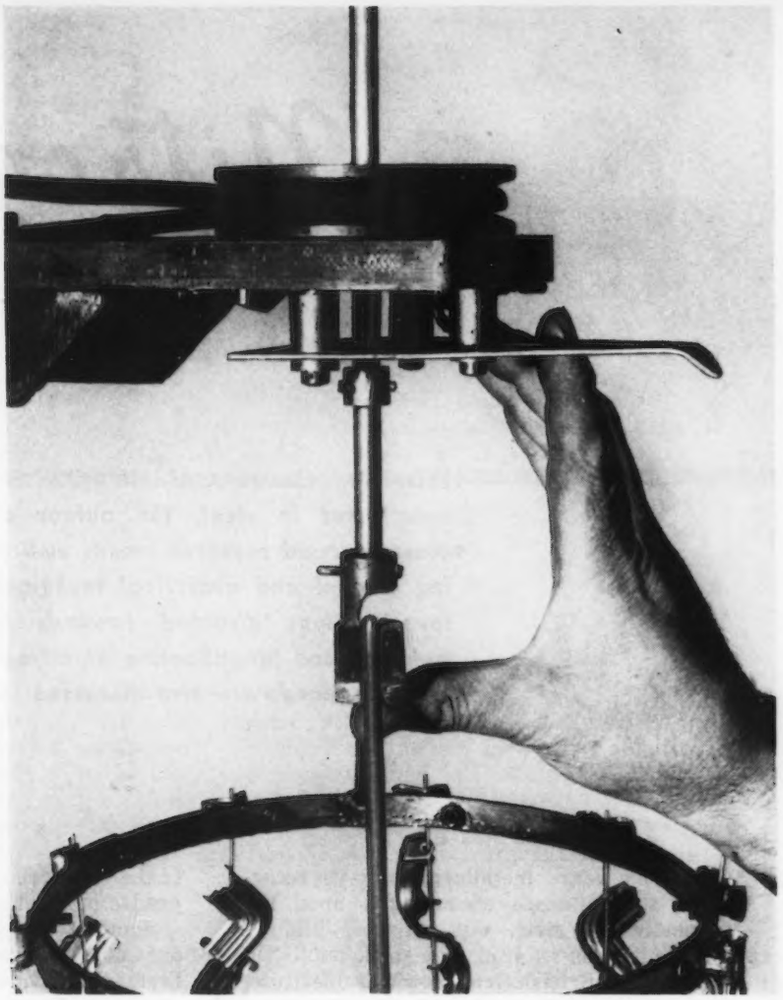


FIG. 2—Rack hanger and drive mechanism which rotates the work while in the bath.

and alloys. Copper articles are readily polished as are articles of copper alloys, such as beryllium copper; nickel silver and German silver, alloys of copper, nickel and zinc; Monel, an alloy of nickel and copper; and bronze, an alloy of copper, tin and zinc. Stainless steel of several grades and some of the alloys of aluminum are also polished readily. In addition to these alloys there are others, notable for hardness or strength at elevated temperatures, of the nickel-molybdenum-chromium-iron type which are also readily electropolished. Patents are being secured on the various novel features involved in the bath and its use, the policy with respect thereto being to license any reputable user.

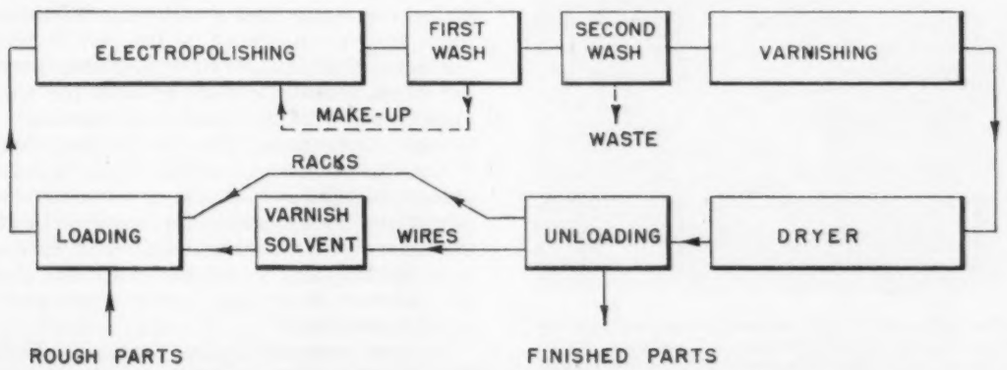
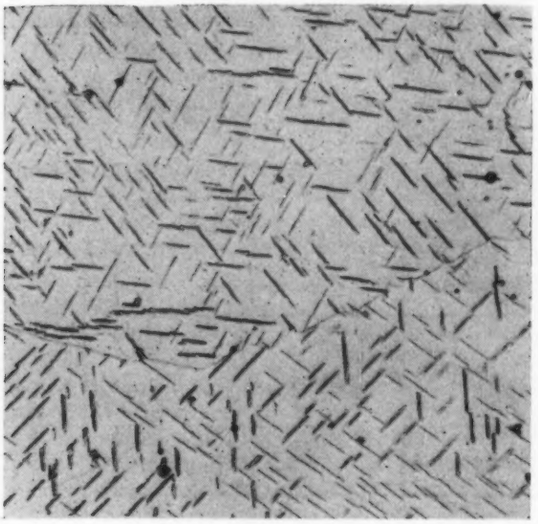


Fig. 3—Diagram of the electropolishing setup, showing work flow.

Nitrogen in

Examining the role of nitrogen as a constituent in steel, the author discusses current research trends embracing control and analytical techniques. Investigations directed towards the isolation and identification of nitrogen compounds are also discussed.

FOR many years metallurgists have recognized the influence of nitrogen upon the properties of steel. An extended bibliography[3] on nitrogen in iron and steel, published in 1935 by the British Iron & Steel Institute, contains references through a period of almost 50 years. It is interesting to note that as long ago as 1889 the quality differences between bessemer and openhearth steel were ascribed to the higher nitrogen content of the converter product; analyses cited were fairly comparable to the values recognized today as typical for these grades of steel.



NITRIDE needles observed in steel nails recovered from the ruins of St. Pierre in Martinique. These nails, buried deep in volcanic ash during the eruption of Mt. Pelee, ranged in nitrogen content from 0.026 to 0.108 pct in individual specimens [1, 2]. 500X.

Some of the early papers on nitrogen are now only of historical interest. However, during the first two decades of the present century there were a number of significant publications on the metallurgical effects of nitrogen in steel. The relationship between nitrogen content and the physical properties of steel seems to have been rather clearly understood by a limited number of metallurgists and even the influence of nitrogen on aging and embrittlement was fairly well established. The practical application of the available knowledge was decidedly limited, mainly because the necessity had not developed at that time. After 1920 the introduction of continuous rolling of light gage strip resulted in a drastic change in the distribution of steel products. Furthermore, fabricators turned increasingly toward cold forming in their operations, metallurgists became concerned with factors involved in aging and strain-embrittlement, and there was a renascence of interest in nitrogen.

Steel companies operating bessemer converters are fundamentally concerned with the metallurgical aspects of the nitrogen question. Even though the tonnage of bessemer ingots produced in the United States constitutes only a small proportion of total output, the practice of charging converter-blown metal in the openhearth renders the converter a more significant unit than superficial examination would indicate. For this reason interest in nitrogen content has been relatively widespread.

A paper presented before the American Iron & Steel Institute[4] in 1932 pointed out that nitrogen was probably the most significant element in steel

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Steel . . .

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in relation to those characteristics that may be grouped under the term "sensitivity." The possibility was indicated that nitrides of aluminum and iron might be significant factors in the behavior of steel under conditions of cold working and aging. These concepts formed the basis for much of the subsequent metallurgical research in the Jones & Laughlin Steel Corp. laboratories.

Recognition of the powerful influence of nitrogen on the properties and behavior of steel presented three general possibilities for steelmaking developments; (1) practices for elimination of nitrogen from molten steel, (2) control of the effect of nitrogen by suitable "deoxidation" practices, and (3) methods of increasing nitrogen content in controlled amounts to obtain a specific, desired effect. Considerable practical success has been achieved along these lines.

The relationship between nitrogen content and the metallurgical characteristics of bessemer steel has long been recognized in a qualitative sense. Researches have been directed toward a more complete understanding of the behavior of this element in the converter process and to the development of effective control methods. A paper on the manufacture and properties of bessemer steel, presented before the AIME in 1935[5] indicated the importance of nitrogen as a criterion of the metallurgical characteristics of bessemer steel.

A later publication described the acid bessemer process of 1940[6] and discussed the control of nitrogen in considerable detail; it was predicted that a knowledge of the forms of occurrence of nitrogen in steel might develop into a subject of the utmost importance. In 1941[7] the broad question of control of converter operation was analyzed with specific attention to the nitrogen question and an improved, patented technique for bessemer flame control, was described. The method involves the application of a photocell, in combination with an amplifier and recorder, to control the operation of the converter.

An important contribution to the nitrogen work was the development of a technique for the rapid determination of combined nitrogen in steel.[8] This method facilitated all nitrogen investigations and has attained wide use in the industry.

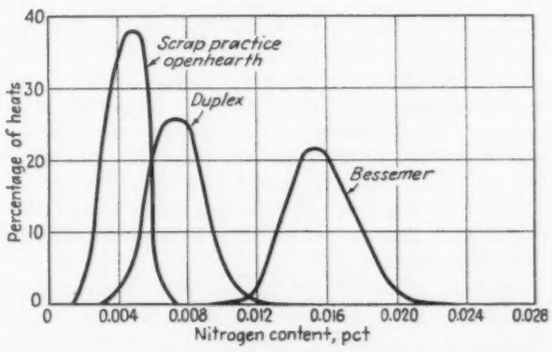

FIG. 1—Nitrogen content frequency distribution for various steelmaking processes.

The duplex process, in which a large proportion of converter blown metal is charged, tends to produce steel containing more nitrogen than the practices using scrap and pig iron (see fig. 1). Researches on duplex operation progressed concurrently with advances in bessemer steelmaking and were the subject of technical papers in 1942[9] and 1947[10]; these discussed the factors that affect nitrogen content in steelmaking operations.

Under ordinary openhearth melting conditions, nitrogen content of the charge is not appreciably reduced, with the result that in regular scrap-and-pig practice openhearth heats the final nitrogen is dependent on that of the materials charged and is generally in the range of 0.003 to 0.007 pct. Early work with the Jones & Laughlin experimental openhearth indicated that the final nitrogen content of the heat could, under certain conditions, be related to the rate of

carbon elimination. This observation led to the development of openhearth practices which deliberately increased the meltdown carbon content and used large amounts of oxygen (in the form of ore, compressed air, or oxygen) to increase the rate of carbon drop during the refining stage, and thus lower the final nitrogen content. This procedure[11] is now applied to the duplex process to produce steel having a nitrogen content and quality usually associated with scrap practice heats.

Although these efforts to control nitrogen content of steel have, in general, been quite successful, it now seems probable that even with the application of all known means for reducing nitrogen during steelmaking, the lower practical limit of nitrogen content in commercial steels is in the neighborhood to 0.003 pct. In cases where even this small amount of nitrogen is too high to obtain the desired performance of the steel, it has been found that the effect of nitrogen may be suppressed, within limits, by the addition of certain elements that are normally considered deoxidizers.

For many years it was thought that the observed effects of "killing" practices on the characteristics of liquid steel and on the properties of the final product were the result of control of oxygen in the steel. More recently, however, it has been recognized that, insofar as the properties of the solid steel are concerned, the important consideration is a reaction between the deoxidizers and the nitrogen of the steel.[12] Not all deoxidizers behave in the same manner; for example, silicon is quite effective in "killing" the molten metal but is only mildly effective in controlling the influence of nitrogen. Aluminum and titanium, when added in sufficient quantity, are quite effective in controlling the adverse effects of nitrogen on the properties of steel; certain less common deoxidizers appear to behave in similar fashion.

At the present time research on nitrogen is being actively pursued along two fronts; (1) control of nitrogen in steelmaking, and (2) development of new analytical methods for determining the chemical form in which nitrogen is present in steel. These fields are related, and frequently advances in one of them lead to developments in the other.

It should be recognized that for many product applications nitrogen is a desirable constituent in steel.[13] Precise control methods in present-day steelmaking operations make possible the attainment of properties of significant commercial value through the metallurgical influence of this element. The nitrogen content of resulfurized openhearth steels is sometimes increased to improve machinability, either by using the duplex practice or by additions of nitrogen. The effect of nitrogen in increasing yield strength of low carbon steels is also used to advantage in certain applications for light gage strip steel. In all such cases the amount of nitrogen is controlled to obtain the desired combination of properties for specific applications.

It now seems necessary to know the chemical form in which nitrogen occurs, before a clear understanding of its role in the overall steel quality picture can be obtained. Thus an entirely new field for both chemical and metallurgical research has been opened. In the case of no other common element in steel, except carbon, has it thus far been found so important to know precisely how that element is chemically combined in order to predict, with reasonable assurance, its probable effect on the properties. Accordingly, J & L research has been directed toward development of an analytical method that would distinguish between the various nitrides. Attempts to obtain the necessary information by means of fractional vacuum fusion analysis were not successful and this approach was abandoned.

After an appreciable amount of chemical research, a method was developed which convincingly demonstrated that aluminum nitride is formed in aluminum-treated steels and some results were first reported in 1945.[14] Since that time, the method has been refined and considerable investigational work has been done on this and other nitrogen compounds.

The discovery of a chemical method for isolating and identifying various nitrogen compounds in steel promises to develop into an analytical achievement of considerable metallurgical importance. With this new tool, much information relating the forms of nitrogen and properties of steel has already been obtained, but the application of this analytical technique to physical metallurgical research is still in its initial stages. It is much too early to predict to what extent the method may find usefulness in routine work, but for research investigations, the horizon seems limitless. It is anticipated that in the near future the work now in progress will be sufficiently advanced to permit release of this analytical technique to the steel industry.

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Protecting Fixtures and Patterns in Open Storage

BY HOWARD N. SMITH
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Strippable plastic coatings have provided the aircraft industry with an inexpensive method of preventing deterioration of metal airframe fixtures and plaster patterns that are stored in open areas and exposed to the weather. More important, this type of coating permits reuse of the parts without extensive reworking or repair. The application of these coatings and economies resulting from their use are discussed.

THE necessity for retaining airframe jigs, fixtures and patterns, because of the possibility of replacement and spare part requirements for both experimental and production aircraft, presents a major storage problem in the aircraft industry. This tooling, large in size and fabricated from iron pipe, steel and plaster, must, in some instances, be maintained for a period of seven years by contractual obligation. Adequate covered storage area to properly house the jigs, fixtures and patterns incidental to the manufacture of a single engine airplane would involve about 5000 sq. ft.

Current building costs, together with the value and maintenance costs of existing facilities, do not warrant the use of a conventional building for the storage of tooling having no known requirement. Such tooling is therefore stored in open areas and is subject to rapid deterioration by the weather. This is especially true in the West Coast aircraft factories located within a few miles of the seacoast.

Preservatives applied to metal jigs and fixtures in the past have consisted largely of various types of paints and oils. No adequate preservative for wooden fixtures and patterns had ever been used prior to World War II. Tooling of this type was usually stored in sorely needed building areas or left to disintegrate in open yards.

Paint will eliminate or retard rust on metal surfaces if rusting has not started prior to painting. Oils are more satisfactory since moisture does not collect on exposed surfaces, but light oils tend to collect dust, which in turn absorbs moisture and destroys the effect of the oil. Heavier viscosity oils solidify and present a problem in cleaning at the time of use. Also, heavier oils do not penetrate threads, bushings, and removable pins, thereby necessitating considerable reworking of the part prior to use.

Plastic envelope coatings were thought to be the answer to tool preservation problems. This was substantiated by preservation methods used by the armed services. Experiments were made at the Douglas Aircraft Co.'s El Segundo, Calif., plant with various types of plastic materials, methods of application and comparative cost analyses were studied. It was determined that strippable plastic coatings provided the best protection and assured expedient readiness for reuse.

The preservation of jigs and fixtures fabricated from iron pipe and steel, as shown in fig. 1, is accomplished in five operations. The tool is spray painted with standard fast drying enamel after all machine surfaces have been adequately greased. The second operation consists of applying standard ¾-in. masking tape in 6 in.

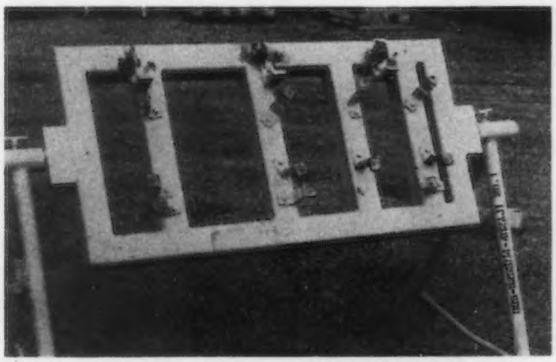
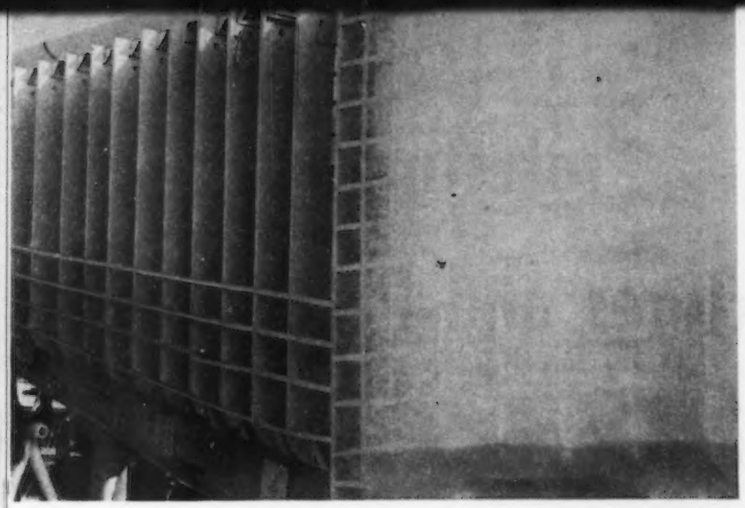


FIG. 1—Prior to the application of the strippable plastic coating, the assembly jigs and fixtures are enamelled and machined surfaces are greased.



squares as shown in fig. 2. The tape is a foundation for the webbing agent applied in the third operation but is not necessary if the area to be covered is small. The webbing agent, also a strippable plastic coating, is applied by a spray gun equipped with a fluid tip and needle under approximately 60 psi from mechanically agitated pressure tanks. The webbing agent, having characteristics similar to a spider's web, fills the voids between the bands of masking tape, as shown in fig. 2.

The fourth operation consists of applying the first coating of the plastic after the webbing agent has dried. This is done using the same type of spray gun at 60 psi from mechanically agitated pressure tanks. The application of the first coating, as shown in fig. 3, is fairly light

ABOVE

FIG. 2—In preparation for storage of large assembly jigs, making tape is applied to form small open areas and a webbing agent is sprayed on as a base for the plastic coating.

o o o

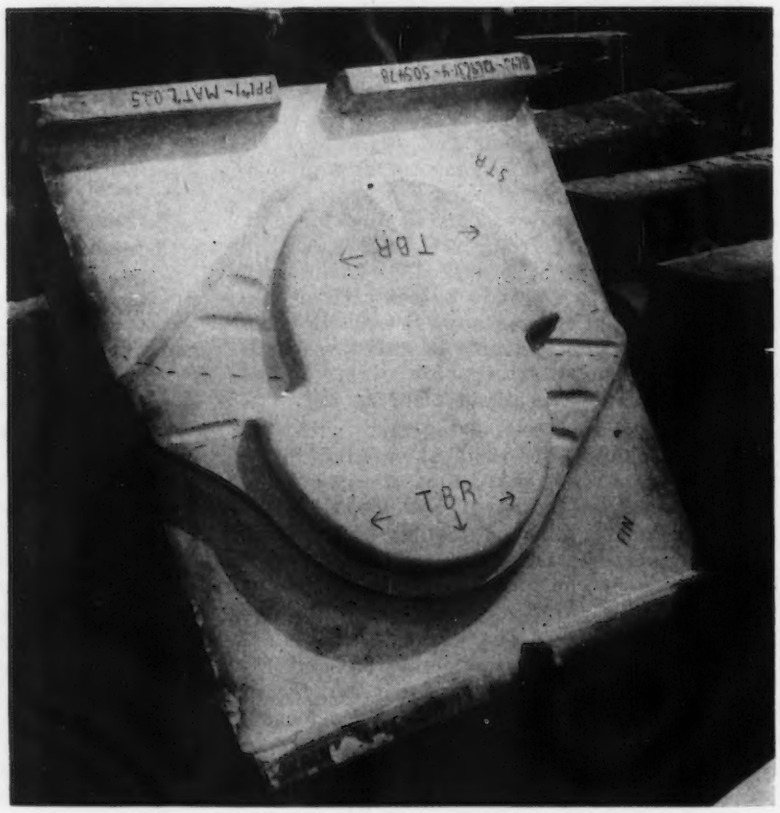
RIGHT

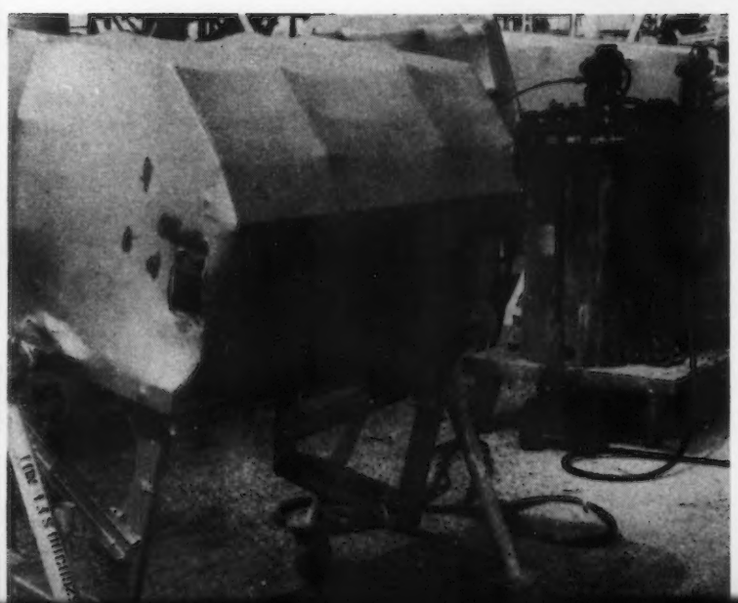
FIG. 4—This is a typical plaster pattern of the type stored in open areas prior to the application of the strippable plastic process.

o o o

BELOW

FIG. 3—A thin coating of strippable plastic is then applied over the tape and webbing agent and allowed to dry. The coating is then built up to a thickness of about 1/16 in.





to avoid too much initial weight on the webbing. All sharp corners and inaccessible crevices are then sealed with Pliofilm tape.

The final operation consists of applying a second heavier coating of the liquid plastic to build up the overall thickness of the covering to 1/16 in. The two coatings may be of different colors, obtained by adding pigment, to assure a complete covering.

To assure complete dehydration of air within the enclosed tool, bags of dehydrating agent, such as silica gel, may be placed within the enclosed tool together with a humidity indicator behind a sealed Pliofilm window. Approximately three changes of dehydrating agent will dry completely the enclosed air. Measurement of water content in the dehydrating agent, when

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removed, will be an indication of insufficient cover.

Plaster patterns, as shown in fig. 4, by the nature of the material used in their fabrication are difficult to store unless placed flat. This presents a storage problem because of the lack of covered storage area. Storage of such tools in open areas subject to the weather leads to almost immediate deterioration. Application of strippable plastic coatings to plaster patterns proved unsatisfactory because the plastic has a slight adhesive quality, and pulls away particles of plaster when removed.

This was overcome by brush applying a thin coating of lard oil to the plaster. This prevents the plastic from adhering to the plaster and has no effect on the plaster itself. The application of the plastic coating is the same as on jigs and fixtures except the taping and webbing operations are not required. Plaster patterns so treated may be stored in open areas indefinitely, as shown in fig. 5, without suffering any ill effect from weather and they are not susceptible to damage normally incurred when stored in racks.

The advantages of using strippable plastic coatings stem largely from the ease and speed with which tools so treated may be prepared for reuse. The plastic covering may be readily cut with a knife and removed in a few minutes, making the tool ready for production use.

The cost of preparing a jig or fixture for inactive storage by use of plastic coating is no higher than the cost of repairing a similar tool for use after being treated with oil and stored for any period of time.

The greatest saving is realized at the time the tool is needed. Time studies made with airframe jigs of average size and complexity indicated approximately two weeks repair time for tools preserved with oil as against approximately 1 hr for tools preserved by envelopment in plastic. This saving is important in aircraft manufacturing because of the frequent urgent need for replacement parts.

The use of strippable plastic coating on plaster patterns also has several distinct advantages. This is the only type of preservative yet found that does not radically change in physical properties when subjected to alternate periods of moisture and dryness and which has no effect on the material covered. It is simple to remove as shown in fig. 6 and leaves a clean unmarred surface. It has further advantages when applied to patterns of large contoured shapes where future reference by tool makers is necessary. A portion of the plastic coating may be removed in the area desired, as shown in fig. 6, and contour information picked up. This area only is then recovered with the plastic coating.

The use of strippable plastic coating as a preservative for tools is an inexpensive method for preventing deterioration when initial cost of the items involved is considered. The cost of materials used does not exceed that of a good enamel paint. The equipment required is simple and inexpensive to operate. The number of employes required to service a storage area of average size is no greater than the number required to preserve the same items with oil. Furthermore,

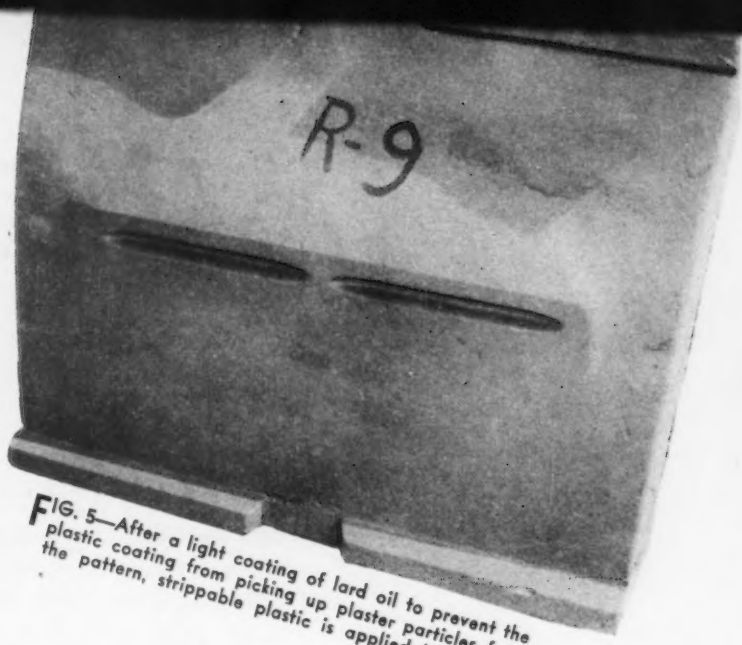

FIG. 5—After a light coating of lard oil to prevent the plastic coating from picking up plaster particles from the pattern, strippable plastic is applied by spray.

it is not necessary to represerve periodically items so covered as is the case when oil is used.

Time and experience, at the Douglas Aircraft Co.'s El Segundo, plant, has proved the use of Liquid Envelope, a strippable plastic coating, method for preservation of large tools stored in open areas to be one of low cost which assures usable tools at any time, regardless of storage area or period of inactivity.

FIG. 6—To examine any part of a pattern after the plastic coating has been applied, the plastic can be stripped from the area.

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How Link-Belt Produces Ball

BY D. I. BROWN
Chicago Regional Editor,
THE IRON AGE

WHILE constant lot inspection of bearing components is maintained during production at the point of manufacture by Link-Belt Co., in its Indianapolis Dodge plant, critical dimensions of parts of every bearing component are 100 pct inspected before the bearings are assembled. Internal and external dimensions, length, eccentricity, surface finish and the identification markings stamped on the bearing are checked.

The parts taken from the grinding or lapping departments are given a coat of Dearborn Chemical's Nonoxide 490 oil preservative to protect them from surface contamination that could result from handling or exposure under ordinary shop conditions. The protective coat has to be thin enough not to affect gaging.

The first part of this two-part article, appearing in the issue of June 23, p. 74, gave complete details on the manufacture of inner and outer races.

Electric comparator gages and standard indicator gages are used to check outside diameters. These gages, even on rapid inspection operations, can check variations to 0.00005 in. Air gages are used extensively to check diameters of bores. On ball bearings the tolerances on such bores range from 0.0005 in. to 0.0007 in. Roller bearing bore tolerances range from 0.0005 to 0.001

FIG. 9—At this inspection bench inspectors are gaging ball bearing inner rings. The gage in the foreground is an air gage used to check tolerances of bore, cut of roundness and axial taper.

and Roller Bearings

The accuracies required of roller and ball bearings demand that inspection techniques be exacting and complete. The methods used at Link-Belt Co.'s Indianapolis plant are described in this article and the manufacturing procedures used in making various types of solid and split bearing mounts and pillow blocks are also discussed.

in. Swedish bore gages having a two point solid contact and one point movable contact are also used to check the bores on some parts.

Lengths and widths of the parts are checked on standard indicator gages, as is eccentricity. Total indicator readings of 0.0004 in. to 0.0008 in. are typical tolerances held on eccentricity of raceway to OD for high speed ball bearings. On roller bearings the tolerances on eccentricity, again an indicator gage reading, range from 0.0004 to 0.0012 in. Many of the indicator gages are so constructed that they can be used with equal facility by right or left handed inspectors. Carbide wear surfaces are used on most gage contact points, whether the wear surface is flat or spherical.

Surface finish is carefully inspected. Visual inspection of all parts is carried out to check for surface cracks, seams or inclusion. Such defective material that may have slipped by production inspectors is caught in final inspection. Visual inspection for defective workmanship includes inspection for grinding checks, chatter roughness or burns.

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FIG. 10—The base of a cast iron split type bearing housing is milled. Later the split line of this base and the cap are milled and become mating parts.

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Specific surface finishes measured by micro-inch master gages are maintained. The degree of finish varies for the location of area on the part. Just as master parts are kept beside each gage for checking dimensions, so master micro-finish samples are used by inspectors for comparing surface finish.

When comparing the surface finish on a spherical part, the inspector uses a spherical master of the finish required. The same micro-finish on a flat sample is usually not identical in appearance as that same finish on a spherical part. A micro-finish profilimeter machine checks such finished master parts and the inspector only has to compare visually production parts to the master.

Fig. 9 is a typical inspection bench, where ball bearing inner ring dimensions are checked. The inspector on the left, at the first inspection station, receives production parts and checks hub diameter and length on standard indicator gages. The next inspector checks the raceway diameter on a shadow gage. Just to this inspector's left can be seen an indicator gage used to check the runout of race to bore. At the next station, in the foreground, ring bores are checked on an air gage, checking for out of roundness, size and axial taper.

After final inspection, parts are cleaned and oiled, loaded on a continuous conveyer belt, and taken into a washer and scrubbed with an emulsion cleaner. An air blast removes excess liquid and the parts enter the drying oven kept at 180°F. On leaving this machine the parts drop into a hot oil bath, Dearborn Chemical's No. 580 oil. The excess oil is drained off, and the parts are then delivered to assembly.

The method is a highly selective assembly of parts in which minute differences of clearances can be constantly controlled and maintained on any given type bearing. Customers specify standard clearances, tight or loose clearances, and every precaution is taken to make certain these specific clearances are fully met.

In ball bearings, inner and outer races are sized into groups of 0.0001 in. increments. The balls are sized into groups that differ in diameter by 0.00005 in. These sized rings and balls are then assembled.

The proper number of balls are gravity fed between the races through a chute, and are distributed around the bearing. The outer ring is momentarily distorted in an air vise sufficiently to get the balls into place between the races. The retainer cages are dropped in after the balls are properly spaced and the bearing is then checked for end-play. This operation determines if the balls have sufficient clearance within the retainer cages.

The two sides of the continuous retainer cage are then riveted together around the balls, and the completed bearing is cleaned in a pressure spray solution and immediately transferred by a continuous belt into a 180°F oil bath. Upon coming out of the oil, they are wrapped in protective paper and taken for assembly into mountings, shipped out, or stored in inventory.

Roller bearing assembly is similar to that of ball bearings. After thorough inspection, the rollers, which have a fine burnished surface, are sized in lots of 0.0001 in. increments. They are then mounted in the retainer ring, and a press forces the lip of one end of the roller over the flange of the inner race. This locks the rollers on to the inner race. The outer race is then placed over the rollers and the bearing is run in and sound tested. If the bearings pass this test, they are cleaned, given a rust preventative coat and wrapped in oiled paper.

Most of Link-Belt's production is mounted

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FIG. 11 — Housings are end bored on this No. 45 Heald Bore-Matic. The carbide tipped tool is working on the far side of the mounting. The table is about to reverse and travel back to the second tool on the front end of the machine, where the other shaft bore will be machined.

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bearings, in many different styles and kinds of housing. In the manufacture of bearing mountings, the first operation following receipt of the gray iron casting for the mountings is to spray them with gray paint. The split style housings are given an additional coat of red on inside surfaces. The bottom of the base casting, in the case of a split mounting, is milled as in fig. 10. The caps of the split mounting are also milled at the split line, and then base and caps are mated. Dowel pin holes and bolt holes are drilled using multiple drilling machines. Lubrication holes are drilled and tapped on another multiple spindle machine, and dowel pin holes are then reamed. From here on the cap and base must be kept together as they are mating parts.

The split style housings are then end bored on both sides for the shaft accommodation. Various seal grooves can be turned on the machine that bores the shaft holes after completion of the boring cut. In fig. 11, the second operation on a split roller bearing housing assembly is being performed. This housing has a 4½ in. diam shaft size bore and weighs 150 lb.

On a No. 45 Heald Bore-Matic the surface on the inside of the housing, into which fits the outer race of the roller bearing, is recess bored. The two halves of the housing are mounted on a base built especially for each size mounting. Dowel pins protruding from the base go up into the dowel holes of the lower part of the housing. The cap is gripped by the air chuck and held down on the base over the dowels just as if the parts were bolted together.

The table, midway between the two boring bars at either end of the machine, is hydraulically operated. After chucking, the table moves over to the roughing tool and feeds in at 0.007 in. per revolution. The tool is carbide tipped with either Carboloy 883 or Carmet CA4. The roughing tool turns at 90 rpm. After this cut is complete, the table is manually reversed and travels back to the other side, where the finish tool starts to work. Feed is 0.016 in. per revolution and the carbide tool turns at 120 rpm. All cutting is done dry and the production for this operation runs a little better than four pieces per hr.

In fig. 12 the ID of a ball bearing pillow block housing is being bored and counterbored on a No. 49 Heald Bore-Matic. As shown, the hydraulic table has moved over to the boring bar on the right, which feeds into the work at 0.007 in. per spindle revolution. This tool cuts half the bore. The table then reverses and moves over to the tool on the left where the other half of the bore is machined. Cutting time is 18 sec on each tool. The cutter spindle speed is 317 rpm and the cutting speed is 250 sfpm. Carboloy tipped tools are used. A chamfering tool chamfers the corner of the counterbore when the bar reaches the end of its cycle.

The whole tool assembly is bolted to the face plate. The base plate again is special for each size of mounting, and mountings are removed by unloosening three bolts. These bolts automatically align the work because when tightened they pull the base against three locating pads. Air chucks as shown are standard equipment on all such machines.

After boring and counterboring, the spherical shape on the ID of the housing is machined. This is the operation shown in fig. 13 and is done on a 47A Heald Bore-Matic. The part is mechanically chucked on a head that revolves at 507 rpm. The cutting is done at 350 sfpm. The hydraulic feed into the work is 0.009 in. per revolution and as the tool starts to retract the feed changes to 0.005 in. per revolution. Thus, the forward cut is a roughing cut and the finish cut is made as

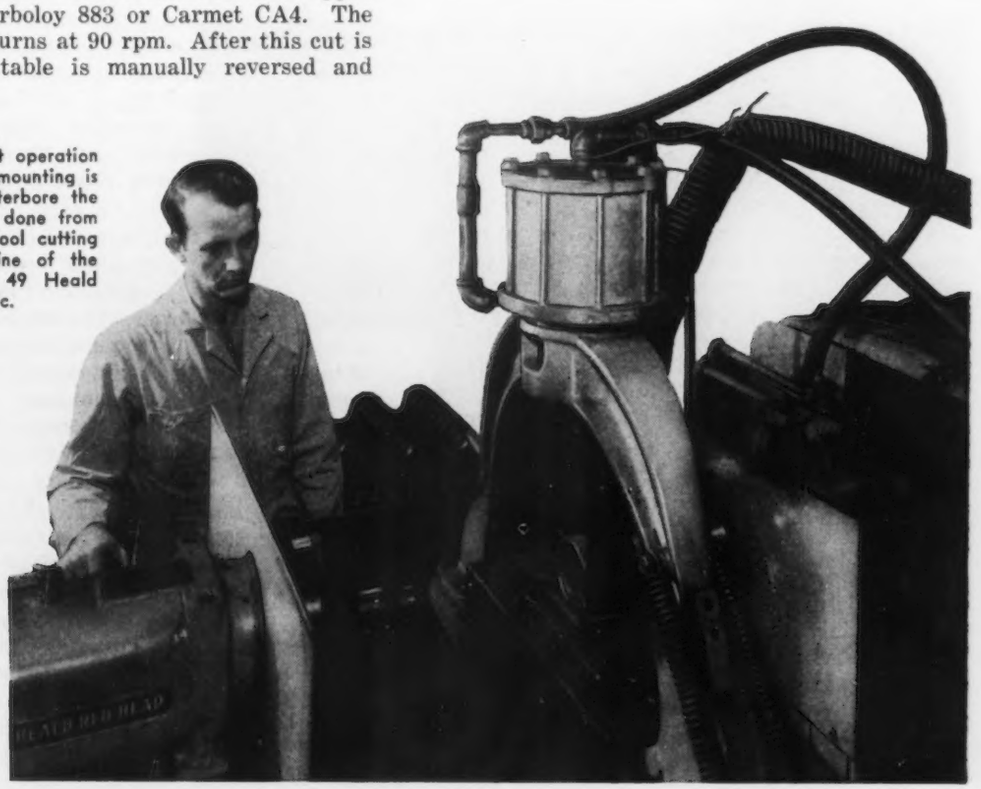

FIG. 12—The first operation on a solid type mounting is to bore and counterbore the ID. Machining is done from both sides, each tool cutting into the center line of the block, on a No. 49 Heald Bore-Matic.

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FIG. 13—This machine cuts the spherical ID bore on a ball bearing housing. The cover of the machine is lifted to show the parallel bars that travel in a rectangular motion, causing the cutting tool to prescribe the desired arc in the spherical raceway.

the tool retracts. Total travel across the spherical bore is $\frac{5}{8}$ in.

Production rate on the machine averages about 60 pieces per hr, and usually the tool will cut 300 to 500 pieces before regrinding. The cutting tool is a single point tool with a brazed Carboloy 905 tip. The cutting is done dry, and the tolerance on this bore is 0.0008 in.

In fig. 13 the cover is opened showing the parallel bars that control the movement of the cutting bar. The control bars move in a rectangular motion, causing the cutting tool to describe an arc. This spherical bore on the ID of the pillow block accommodates the outer ring of the ball bearings. The OD of the outer race of the bearings fits the spherical ID of the housing, but it is not a close binding fit. The bearing can turn approximately 5° within this spherical housing and take care of a certain amount of misalignment.

On solid housings, such as pillow blocks, some provision must be made so that the bearing can be inserted into the mounting. The OD of the bearing is larger than the bore diameter of the block at the edge of the mounting. In fig. 14 this provision is being accomplished.

Entrance slots are shown being milled in fig. 14 on a Cincinnati profile milling machine. These slots are 180° apart and offer just enough clearance for the bearings to be inserted. Usually the slots are 0.025 in. to 0.030 in. larger than the diameter of the spherical bores. The slots extend only to the center line of the housing. In this contour milling operation four housings are slotted simultaneously. A 15 in. feed is used with the 18-4-1 high speed cutters turning at 150 rpm.

The four castings are mounted on air chucks of the internal expanding type. The tracing finger follows a rectangular tamplet, which is curved at each corner. The machine will not run unless the finger is engaged against the templet. It takes 24 sec for the finger to travel around the templet. To load and unload the four pieces takes the operator an average of 54 sec. The total time to machine the four castings then is 78 sec, or 20 sec each.

The chucking fingers extend halfway into the housing so not to interfere with the slotting tools. The air motors below the rack of parts as shown in fig. 14 drive the chucks and are geared directly to the fingers. The cylindrical grooved handles control each of the motors separately. In chucking, the operator opens the throttle and the air motor tightens the fingers and the motors run until they stall.

Fig. 15 shows one of the final assembly lines.

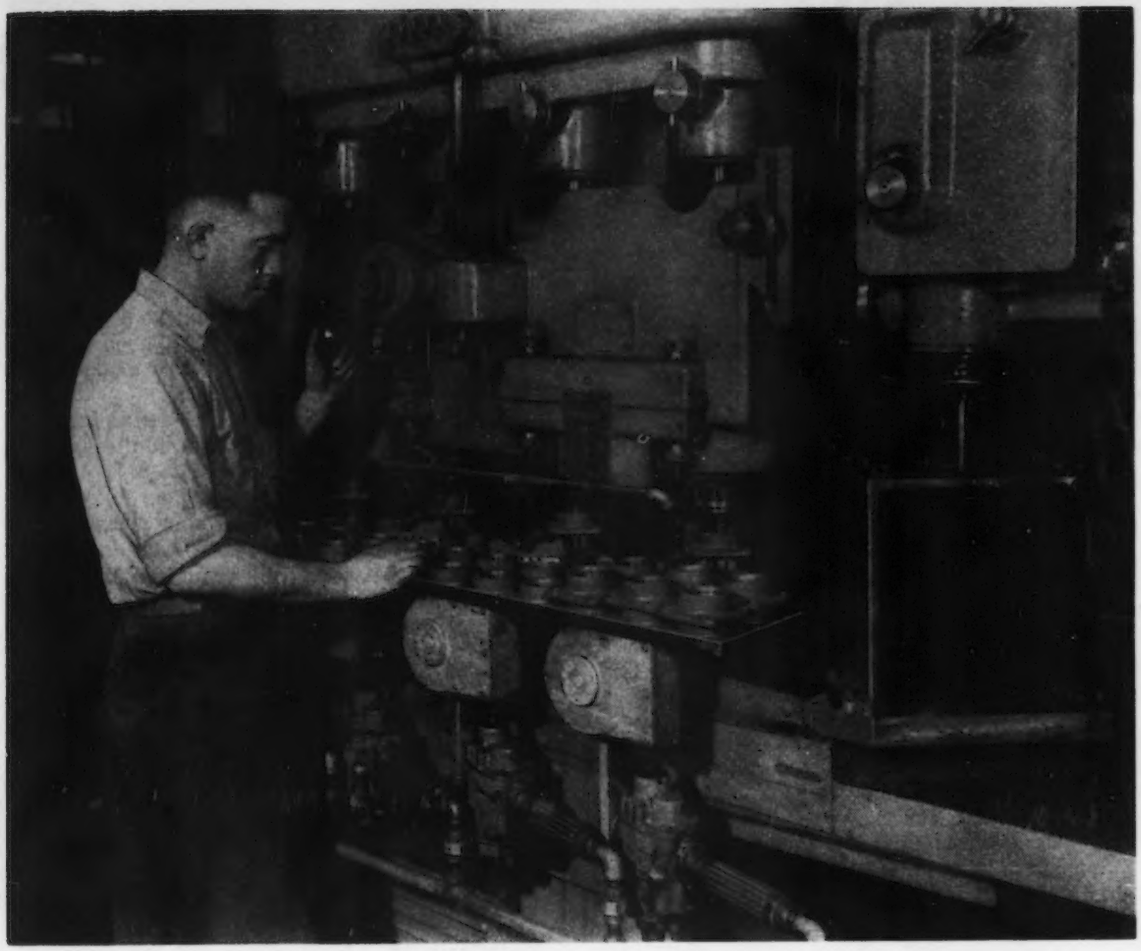

FIG. 14—A Cincinnati profile milling machine slots solid housings for bearing entry. The tracing finger is visible at the left. Four air motors in the lower part of the photo drive the internal expanding chucking fingers gripping the parts.

The workman in the foreground is placing the bearing seals into the housings. The press directly in front of him presses these seals into place. The housings on the table to his left contain the bearings, with oil or grease fittings already attached.

Further along this line other parts are added to complete the mounted unit. In addition to seals, the collars, covers, caps and other parts are assembled. The last operation consists of wrapping the mounted units in protective paper and boxing them. The bearings are greased or oiled prior to wrapping so that the user can simply take them out of the cartons and put them in service.

FIG. 15—On this final assembly line the operator is inserting bearing seals, which are pressed into place in the press.

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Power Plant Operates at 1050°F

SEWAREN, N. J., power station operating at steam temperature of 1050°F showing semi-outdoor boilers and coal handling conveyor system.

USE of high temperature steels in the new Sewaren, N. J., steam power station of Public Service Electric and Gas Co. has made it possible to generate power at low cost by operating at a steam temperature of 1050°F, higher by 50°F than any other power plant installation in the world.

The Sewaren station marks a transition point in power plant engineering because of the use of austenitic steels in the high steam temperature regions heretofore confined principally to the ferritic alloy steels. The use of the austenitic steels involves an important jump in the cost of this equipment, plus the solution of new problems in fabrication and joining methods.

For many years the trend in steam power plant engineering has been toward higher operating temperatures. Steam pressures have also been rising, but greater operating efficiencies are resulting from temperature increases. It is estimated that the overall steam plant efficiency is improved by 1 pct for each 10°F rise in steam temperature.

Maximum steam temperatures at the Sewaren plant are confined to a few parts of the plant, including the last few loops of the high temperature stage of superheat, the upper end of the turbines and the main steam system. The problem is to obtain strength at high temperatures in these parts, together with resistance to oxidation on the inside surfaces and to corrosion on the outside.

At Sewaren, steam enters the high temperature stage superheater at 850°F or more where it passes at first through loops fabricated of tubing containing 1.25 Cr, 0.55 Mo, 0.75 Si. The medium temperature range of this stage of superheat employs tubing with 5.00 Cr, 0.55 Mo, 0.70 max Ti. In the 1050°F range tubing is used containing 17 to 20 pct Cr, 9 to 13 pct Ni and 0.60 pct Ti.

In the low temperature stage superheater, the sequence of tubing is carbon steel, carbon-molybdenum and chrome-silicon-molybdenum at the high temperature end.

External connections between the superheater outlet terminals and the steam header are made of tubing containing 2.75 to 3.25 Cr, 0.80 to 1.00 Mo.

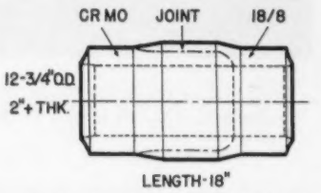
The main steam line at Sewaren was made by forging and boring a ferritic steel containing 3 pct Cr, 1 pct Mo. It is estimated that this 70 ft line, 16½ in. OD with a 2¾ in. wall thickness, cost $1,000 per foot installed. Branch lines 36 ft to 48 ft long, 13 in. O.D. were made of the same alloy, also forged and bored.

Turbine stop valves made of 18-8 stainless steel control flow to the turbine steam admission lines 6 in. and 8 in. OD also made of 18-8.

Since stainless steel expands about 50 pct more than the ferritic steel of the main steam line, it was necessary to develop a new technique for the welded joint between the two metals. Developed by M. W. Kellogg Co., the supplier of the pipeline, the joint is designed to have the major portion of the interface in a longitudinal direction rather than the normal transverse welded joint. This type of joint, identified as the "Kelcaloy" process, is subject principally to shear stress as the result of the internal pressure or bending forces. It is illustrated in the accompanying photograph.

The piping systems of the plant are designed for the maximum use of welded joints. The only flanged joints exposed to steam at 1050°F are those in the steam admission pipes from the turbine control valves to the top half of the high pressure turbine casing. There are no flanged joints in the high pressure boiler feed line.

KELCALOY joint used between dissimilar metals to control stresses of differential expansion.



Steam for the first three turbine-generators is supplied by three identical water tube boilers made by Combustion Engineering-Superheater, Inc. They are of the three drum, radiant type with a continuous rating of 850,000 lb per hr. The maximum boiler rating is 950,000 lb per hr for 4 hr at 1500 psi and 7050°F.

The newest steam power plants operate at about 90 pct boiler efficiency. While there is little margin for further improvement here, overall plant efficiency can be improved still further by operation at even higher temperatures. During the war synthetic rubber plants were built to operate at steam temperatures as high as 1400°F. The steam generated in these plants was used for processing operations at relatively low pressures. The use of alloys for high temperature operation began only about 12 years ago. Current developments in steam power plant engineering have been paced by the developments in the field of heat and corrosion resistant alloys. Developments in fabrication and joining techniques suitable for these alloys have also been a factor.

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New Production Ideas . . .

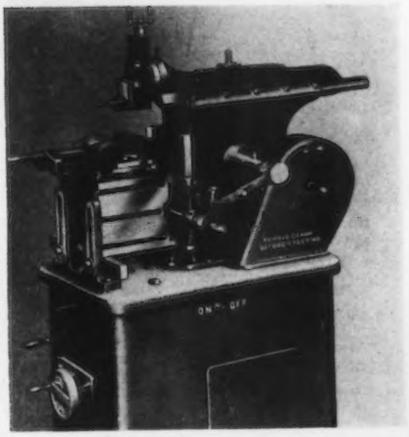
New and improved equipment and methods featured this week include: Grinding machines, a utility shaper, a special milling machine, automatic followers and a turret lathe attachment, wire tinning, automatic ladling of molten metals, an arc welder for light gage welding, drills, milling cutters, lapping tools, carbide center blanks, and various material handling units.

A NEW high production grinding machine, the Micro-Centric, grinds the OD of work by the infeed method. Its principal

field is in the manufacture of bearing races and other short parts ground to super-precise tolerances of roundness and squareness with one side. Employing a new principle of work support and rotation, the machine will, without centers or a chuck, easily hold roundness under 0.000025 in. The ground diameter can also be held square with a pre-finished face under 0.000025 in. accuracy. Micro-Centric grinders are made in two sizes and either can be built for full automatic operation or for hand loading. The No. 1 machine will grind work diameter from ¾ to 3½ in. either automatic or hand loading; No. 2 machine handles pieces from 2 to 4 in. diam, automatic loading or 2 to 8 in. diam when hand loading. These machines operate by a method wherein the grinding wheel head, pivoting on a trunnion under wheel spindle, is rocked forward into grinding position through a definite preset cycle. This cycle develops in four phases; load, rapid advance, feed and dwell, retraction and unload. Each phase can be individually controlled; each is flexible and simple to adjust. On standard machines, the headstock and work holding fixture are mounted on a swivel plate that can be adjusted through 90°. Ways and moving parts are completely guarded. *Cincinnati Grinders, Inc. For more information, check No. 1 on the attached postcard.*

Shaper

SAVINGS in setup time and power costs are claimed for a new shaper with an 8½-in. maximum stroke that permits full and ac-



curate machining of work 8 in. long. Straight cuts, angular cuts, squaring, machining, and slotting are handled on the machine. Six automatic feeds in either direction, from 0.002 to 0.012 in., are set by a feed dial with reading graduated to 0.001 in. A halfturn of the feed handle in either direction reverses the feed. Any speed from 35 to 180 strokes per min is obtainable, and speed changes are effected by turning a hand wheel control. The 8x8-in. table has a vertical travel of 5½, and a traverse of 10½ in. Because the tool head may be swiveled 360°, squaring the ends of stock of almost any length is possible on the shaper. *Logan Engineering Co. For more information, check No. 2 on the attached postcard.*

Automatic Followers

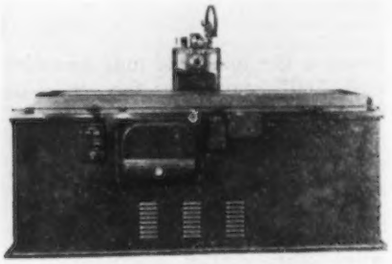
AUTOMATIC control of cutting tools covering paths of travel not obtainable in the standard movements of machine tools is now accomplished with a line of automatic followers. The follower device is a semi-robot that will follow a predetermined path of travel. It has a tracer capable of controlling direction, rate, and amount of movement. Tolerances are held to 0.001 in. of travel in the machine movements. Basic parts of the device consist of a power unit supplying fluid under pressure; a tracer controlling the flow of oil supplied by the power unit; and cylinders (or fluid motor) transmitting the controlled fluid flow under pressure to the movement desired. Combi-

nations for converting standard machines into a high production setup are numerous. The unit illustrated shows the use of a tracer where a compound slide is mounted

at 45° to center line of lathe and is controlled by a follower. *Turchan Follower Machine Co. For more information, check No. 3 on the attached postcard.*

Special Milling Machine

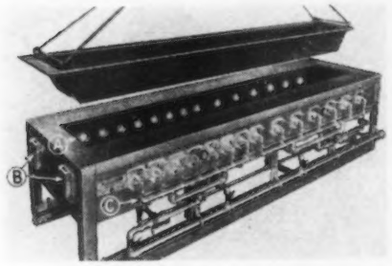
AN automatic bar feed machine for cutting off or multi-milling operations has been designed. In operation, after the bar is placed in the fixture, the head that carries the cutter travels in a down



direction until the cutter approaches the parts to be milled or cut off. The head then automatically goes into feed, feeds until the part is cut off or milled then reverses and returns in rapid traverse. During the reverse stroke the finished parts are automatically ejected and the bar is moved into place so that the next part can be milled. This operation is continuous until the bar is used up. *Kent-Owens Machine Co. For more information, check No. 4 on the attached postcard.*

Wire Tinning

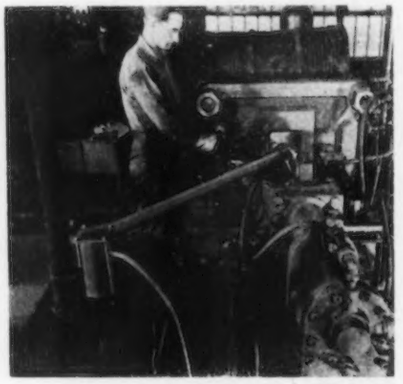
MULTIPLE strands of wire in gages from 4 to 20 can be tinned continuously at production rates of 150 to 500 fpm in pots heated by radiant ceramic gas burners in furnaces. Air-gas mixing systems, installed with the fur-



naces, regulate fuel supply for most complete and effective combustion. The radiant burners are spaced to apply the greatest concentration of heat at the end where wire enters the pot and to maintain the required temperature throughout. Increased pot life is attributed to the method of applying heat from the radiant burners in patterns along the sides of the pot. This type of pot furnace is applicable to hot coating processes such as rosin, lead, zinc, and plastics. *Selas Corp. of America. For more information, check No. 5 on the attached postcard.*

Automatic Ladling

AUTOMATIC ladling for removing molten aluminum from melting furnace to diecasting machine has been developed. Operation of the ladling unit is said to be simple. The discharge side of the furnace is sealed over with a metal plate through which extends a refractory tube. By means of a hollow graphite block and a graphite tube mounted on the furnace cover, the discharge chamber is connected to the injection sleeve just ahead of the piston. Also extending through the cover is a



pressure line connected to a nitrogen tank. This nitrogen line has a pressure control and solenoid valve. By means of a timer synchronized with the diecasting machine controls, the valve is opened to admit approximately 1 lb of pressure to the surface of the molten metal. By controlling three factors—length of time pressure is applied, the amount of pressure, and the diameter of the graphite pipe—the quantity of molten metal forced into the diecasting machine can be accurately controlled. *Lindberg Engineering Co. For more information, check No. 6 on the attached postcard.*

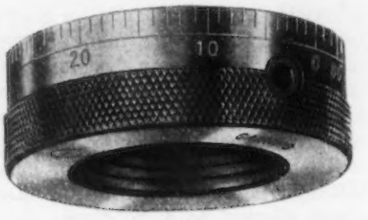
Small Arc Welder

A SMALL low cost arc welder, operating off a 110 v light circuit, yet said to have design and operating characteristics comparable to larger industrial welders, is available for repairing and fabricating in metals in light gages. With a maximum output of 60 amp, the Lincwelder 60 is made with electrical steel, mica insulation and glass covered copper windings, is approved by Underwriters' Laboratories, and is simple and safe to use. Weighing approximately 50 lb, it can easily be carried by its handle, plugged into the nearest light socket and used wherever it

is needed. The Lincwelder 60 is available with 6-ft insulated cord, standard plug for light socket, protective welding head shield and lens, electrode holder and 9-ft cable, ground cable, and a supply of electrodes and brazing rods. *Lincoln Electric Co. For more information, check No. 7 on the attached postcard.*

Micrometer Adjusting Nut

ON drill heads and multiple spindle setups Micro-Nuts set tools to correct depths and permit quick and accurate individual adjustment, after replacement or regrinding. Accurate adjustment is guided by 0.001 in. graduations. The set screw does not bear against the adapter threads. It gives a full grip on the threads all around by moving top and bottom parts of the nut in opposite directions, thus



providing firm and parallel contact against the end of the machine spindle. Ful-Grip Micro-Nuts will retain their true diameters, as the rings are solid and threads uninterrupted. They are made in standard sizes from ¾ to 1⅞ in. with National Acme thread. V

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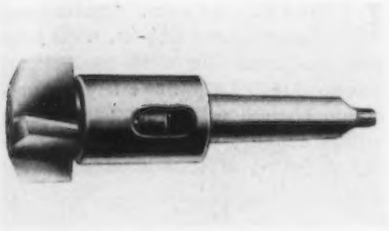
thread is made to order. *Gairing Tool Co. For more information, check No. 8 on the attached postcard.*

Core Drill Cutter

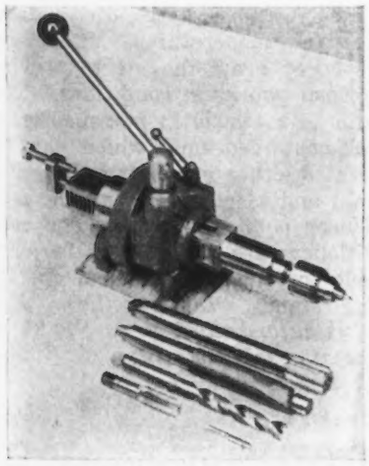
AVAILABLE in 25 different sizes from 1½ to 3 in. in cutter diameter, the new high speed steel core drill cutter will remove approximately 45 pct of its diam-



eter, i.e., the 3-in. cutter will enlarge a 1⅝-in. hole to 3 in. Only four holders are required for the entire series. Cutters are four fluted, and narrow lands and small degree of back taper decrease friction, allowing more power for profitable cutting, it is reported. The short length of cutter and counterbore driver eliminates excessive overhand, giving increased rigidity for precision work. *Scully-Jones & Co. For more information, check No. 9 on the attached postcard.*

Turret Lathe Attachment

TAPPING from 6/32 to 4 in. and operations such as centering, drilling, reaming and counterboring can be done on turret lathes



with the use of the Star Sensitive Turret Attachment. The attachment is mounted in any one of the turret positions and the handwheel is used to bring the turret up near the work. Using the lever arm to control in-and-out motion, the lathe operator has sensitive finger-tip control of the operation to be done. The front of the ram of the attachment is cylindrical and equipped with No. 4 Morse taper hole, drift pin and shear pin holes. Fives sizes are available and all mount directly on turrets with or without adapters, depending on the model lathe. *Williams & Hussey Machine Co., Inc. For more information, check No. 10 on the attached postcard.*

Milling Cutter Blades

SERRATED milling cutter blades, having brazed-on Kennametal tips, are produced to specifications in a wide variety of forms. They are available ground with any of the common types of serrations such as 90°, 60°, or those having combination plane and serrated surfaces. *Kennametal Inc. For more information, check No. 11 on the attached postcard.*

Carbide Center Blanks

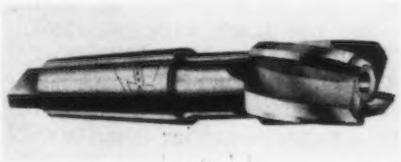
LENGTH of improved standardized solid carbide blanks for lathe and grinder centers has been increased to provide longer center life and to give a stronger design. Seven sizes available include a center blank 1⅜ in. long, and diameters range from 0.250 to 0.875 in. Blanks are ground to a tolerance of +0.000 in. and —0.002 in. on the diameter. Center blanks are standard in Carboloy Grade 44A only. *Carboloy Co. Inc. For more information, check No. 12 on the attached postcard.*

Offset Tools

A LINE of offset tools with mechanically-held Kennametal tips is being produced for machining operations such as facing with tool shank perpendicular to the work, or turning with the tool shank parallel to the work axis. The tip is held in position in a heat-treated steel shank by a spring steel clamp. When the tip becomes dull it can be advanced and reground. Grinding is usually required on one surface only. Tools are available in five sizes: 1 or 1¼ in. square x 7 in. long; 1½ in. square x 10 in. long; 1 in. wide x 1¼ in. high x 9 in. long; and 1 in. wide x 1½ in. high x 10 in. long. *Kennametal Inc. For more information, check No. 13 on the attached postcard.*

End Mills

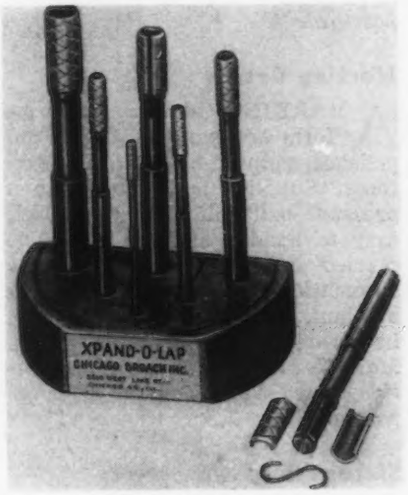
A NEW line of carbide end mills are available in styles for machining all types of steel, nonferrous materials and cast iron. New design provides extra strength in the body of the tool and additional backing for support of the cutting edges. Cutting edges are diamond lapped. Shanks are especially heat treated for greater strength and



rigidity. Greater chip capacity features the end mill used for nonferrous materials. End mills are available in straight and taper shank styles with straight and right or left hand spiral flutes. Sizes range from ¼ to 2 in. *Wendt-Sonis Co. For more information, check No. 14 on the attached postcard.*

Lapping Tools

OUTSTANDING feature of new lapping tools is self-aligning sleeves that are self-expanding when inserted in a hole for lapping, performing as if equipped with a universal joint. Disassembled, the tool consists of one steel arbor, two copper sleeves and one S shaped spring. The lap is self-expanding because of constant pressure exerted by the spring on the two sleeves. Serrations on the sleeves

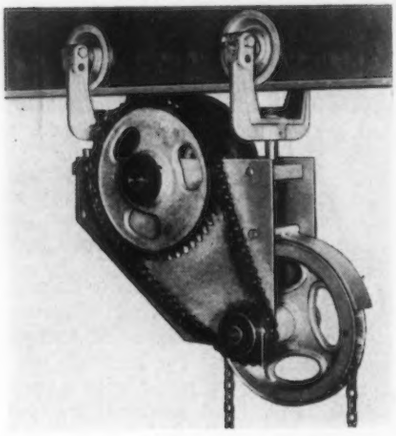


act as channels in which the lapping compound may flow. Xpand-O-Laps may be used in a multiple setup for lapping several holes at one time by inserting in a multiple

drill head. Laps are furnished in sets of six ranging from ⅛ to ½-in. in 1/16-in. steps. *Chicago Broach Co. For more information, check No.* 15 *on the attached postcard.*

Monorail Carrier

A NEW compact drive unit for propelling monorail carriers along overhead track operates through a simple hand chain and sprocket arrangement. Loads up to track capacity can be moved along the track with this Mono-Tractor at the rate of 1 ft per each 28½ in. overhaul of the hand chain. Normal movement of a 1-ton load on a monorail carrier is made with a 10 lb pull at the rate of 100 fpm.



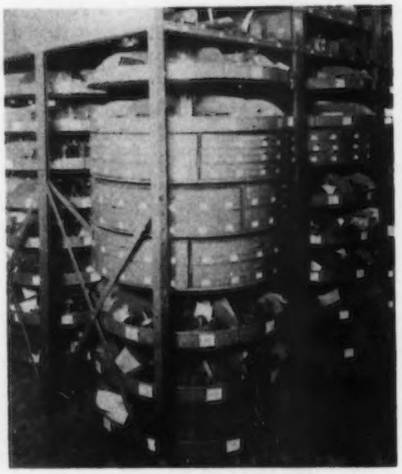
Traction, independent of weight, is obtained by contact of the rubber drive wheel against the bottom of the monorail track. *American MonoRail Co. For more information, check No.* 16 *on the attached postcard.*

Marking Device

A MARKING device in tube form works on polished or unpolished, painted or unpainted surfaces. Supplied in a tube, with a pressure ball point, it is compact, easy to handle, and can easily be carried in the vest pocket. The automatic, self-contained tubes hold brilliant, opaque, fast drying inks in a variety of colors and widths. *Mark-Tex Corp. For more information, check No.* 17 *on the attached postcard.*

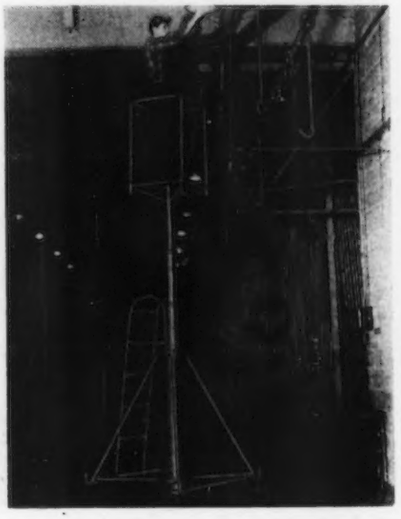
Storage Bins

TIME required for storing and servicing parts and tools is claimed to be materially reduced through the use of Rotabins which are circular, rotating-shelf units. Trays rotate on ball-thrust bearings and it is claimed trays will not sag or break when fully or unequally loaded. Installation requires little time, as Rotabins stand independently on a solid, heavy steel base. *Frick-Gallagher Mfg. Co. For more information, check No.* 18 *on the attached postcard.*



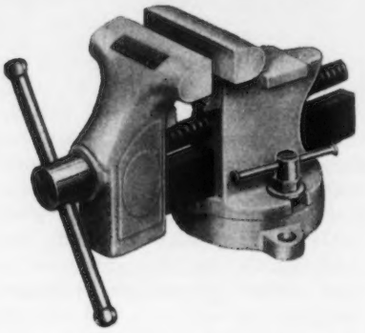
Rolling Maintenance Tower

TO speed overhead factory and building maintenance, a hydraulically-raised, manually operated rolling work tower has been developed. The unit is all-steel for strength, rigidity and worker safety. Controlled from the platform, the lift is designed for one-man operation. Work may be performed at any platform level from 7 to 17 ft above the floor, making it possible to reach equipment as high as 22 to 23 ft. The platform is raised on a telescoping ram by means of hydraulic power. A guard rail measures 2 ft 9 in. high and may be lowered instantly to clear low doors. A broad, stable base measures 4 ft 3 in. square. The tower is held by means of a positive safety brake on each caster that locks both the wheel and the swivel. *Safway Steel Products, Inc. For more information, check No.* 19 *on the attached postcard.*



Utility Vises

UTILITY vises, tradenamed Hanco, have 3½-in. wide jaws and are available with or without swivel base. They have a steel precision threaded spindle ⅞-in. diam and are made of a semi-steel casting showing a tensile strength of more than 26,000 psi. *Wilton Tool Mfg Co. For more information, check No.* 20 *on the attached postcard.*



Crane Conditioner

A SMALL, powerful crane cab conditioner, 38x17x48 in., has been made available for cabs exposed to fumes, gases, dirt and excessive temperatures. It filters, cools, or heats the air to provide normal working conditions. The unit is available in two models: a self-contained unit which can be located either inside or outside the cab; and a split unit with the condenser outside the cab. The conditioners are also said to be suitable for small pulpits and operating stands. *Lintern Corp. For more information, check No.* 21 *on the attached postcard.*

Dual Valve

DEVELOPMENT of a 36x8-in. 150-lb class B steel dual valve for an operating temperature of 1000°F has been announced. Body casting is chrome-molly steel. Powered by separate electric motors, each alloy steel vane is operated

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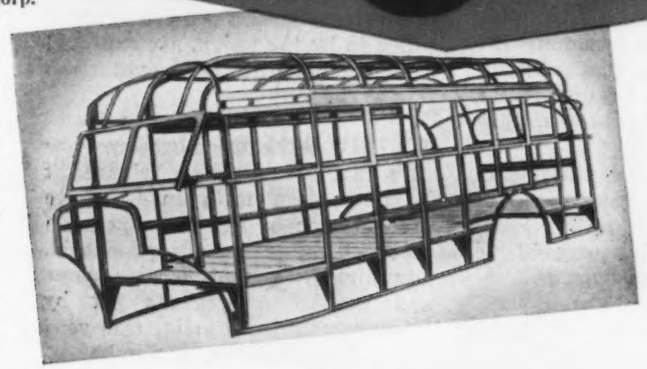
Pictures courtesy of Oneida Products Corp.



The greater strength and toughness of N-A-X HIGH-TENSILE steel permits weight savings of up to 25% in section—and still affords maximum protection against injuries from traffic accidents.

Its superior fatigue-resistance and excellent weldability prolongs this safety-factor . . . reduces maintenance costs over more miles and under all conditions.

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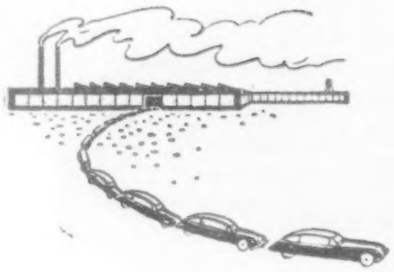
Assembly Line . . .

WALTER G. PATTON

• Pensions will be the No. 1 issue in the 1949 Ford negotiations . . . Hudson reveals its plans for supplying high compression engines . . . Great Lakes names Mr. Smith to head its metallurgical control activity.



DETROIT—It is becoming increasingly clear that pensions will be the No. 1 issue in auto industry labor negotiations this year.

In a sharply-worded statement, Walter P. Reuther, president of the UAW-CIO, called the recent Ford 18 month stabilization proposal "a flight into fancy" and "upsidedown economics."

"Workers are getting too little in wages—not too much," Mr. Reuther argued. "Failure to increase purchasing power and worker security will only intensify, not relieve, the unemployment situation," Mr. Reuther told Ford's industrial relations director, John S. Bugas, who had asked the union to set aside temporarily its economic demands for company-financed pensions, health and life insurance and wage increases.

Mr. Bugas had previously told Mr. Reuther that industry was indeed at an economic crossroad and, by pressing its wage demands, the union would only accelerate the present downward trend. He cited rising unemployment—a possible 5 million this summer—compared with 1,900,000 in April 1949. Industrial production is already off 10 pct, he reminded Mr. Reuther. Mr. Bugas also pointed out that the cost of living is falling and this will eventually mean lower wages for Ford's competitor, General Motors. Mr. Bugas contended that security for Ford workers could best be obtained by holding or reducing labor costs—not by increasing them.

The Ford wage stabilization proposal called for an 18 months moratorium on all general economic demands, with possible adjustments by either party on Jan. 15 or July 15, 1950 in the event of a change of four points or more in the cost of living price index.

Accompanying Mr. Reuther's rejection of the Ford stabilization proposal, the UAW-CIO presented the Ford negotiators with an elaborate 133 page brochure, including 9 charts and 11 statistical tables, purporting to show that the company can well afford to pay $100 per month pensions to Ford workers 60 years of age and over after 25 years of service. Several pension experts, called in by the union, are expected to be brought into the negotiations this week.

WHILE the union brochure has not been publicly released it is known to contain an elaborate presentation of age data, pension cost schedules, benefit proposals, administration and service costs and pension precedents set by other companies. Earlier this year the union called in a number of Detroit insurance company officials to discuss the pension and insurance plans the union was considering.

Part II of the union demand calls for insurance benefits. This demand will be similarly presented to the company at a later date.

Part III represents a union demand for a cost-of-living wage increase. Thus far, nothing has been heard from this.

Various estimates have been made of the estimated cost of the union demands, if granted in their entirety. A survey conducted for the UAW-CIO estimated that company-financed pensions, as presently proposed by the union, would cost Ford 29¢ per hr. Mr. Reuther has fixed the cost of group insurance for Ford workers at 8¢ per hr. The cost-of-living wage increase totals approximately 10¢ per hr.

Up to the present time, Ford has held to its original position that any union wage boost would increase costs and would be unsound. Ford insists such an increase cannot be paid out of present or prospective Ford earnings.

Of particular interest to the public will be the union's effort to prove Ford's ability to pay without having access to financial statements of the companys' operations. Ford earnings are not, of course, a matter of public record. Only a balance sheet showing the *net* changes in the Ford financial position are made available to the public each year.

•

Hudson Holds Preview Of Its New Engine

Detroit

• • • **It has always** been a debatable engineering question as to whether or not it is necessary to use overhead valves and design a completely new auto engine to take full advantage of present developments in high compression power plants. GM says you have to start from scratch. The independents have argued there are other means to the same desirable end.

This week, Hudson engineers held a demonstration for the press of its new six cylinder engine equipped with a special aluminum head. Operating on 100 octane fuel at a compression ratio of 9.3 to 1, the new Hudson Super Six engine exhibited remarkable performance in trials on the public highway.

Rated normally at 121 hp, the power of the engine has been increased by 9 pct by the new high compression head, it was disclosed.

Highway speeds up to 100 mph were reached in the test runs with newspaper men at the wheel. Top speed of the car so equipped is considerably beyond the century. Some claim the car will accelerate from 0 to 90 mph in less than 30 sec.

Hudson has a long list of accomplishments in engine design to back up its present claims of producing a superior car engine. As far back as 1915 the company built

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Electrolimit Height Gage transferring basic accuracy from P&W Precision Gage Blocks.

Electrolimit Internal Comparator, set up right at the machine, checking the finish ground hole of an automotive connecting rod.

Electrolimit Snap Gage checking automotive crankcase bearings . . . assuring perfectly matched assembly with similarly graded connecting rods.

3-Station Electrolimit Internal Comparator gaging I.D., squareness and concentricity of a refrigerator compressor part.

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No function is so vital to mass production as gaging . . . no equipment is so precisely fitted to the purpose as P&W Electrolimit Comparators. They're made at "Accuracy Headquarters", and that means every element, from design through performance, is controlled with meticulous care by P&W Gage-experienced engineers and precision-trained craftsmen. The result: fast and accurate direct readings to "tenths", even "hundredths" — and a satisfying economy in selective assembly gaging and in quality control all the way down your production line.

The complete story of P&W Electrolimit Comparators appears in these interesting and completely illustrated Bulletins. Shall we send copies?

Electrolimit Comparators checking and grading outside diameters of outboard motor pistons, and wrist pin holes.

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a car with 5 to 1 compression ratio when the rest of the industry was using 4 to 1. Every Hudson engine since that time has had successively higher compression ratios, according to A. E. Barit, president of Hudson. The present six cylinder engine was conceived during the war, Mr. Barit said, when high octane fuels were in greater supply than at present. All components of new six—crankshaft, bearings, connecting rods, etc—were designed with higher compression ratios in mind, he said.

"When it became obvious that higher octane fuels would not be immediately available, it then became an easy matter to arrange the high compression design for present day fuels," Mr. Barit told the press.

The Hudson chief executive said the demonstration was planned in response to the demand of Hudson owners and dealers to better inform the public on the background and high compression possibilities of the new Hudson engine.

According to its engineers, the Hudson engine, when equipped with a high compression L-head, is capable of operating on suitable fuels up to 12.5 to 1 compression ratio. Hudson engineers further contend that the L-head engine has fewer parts and will develop more horsepower per cubic inch than any other type of valve arrangement. They also say the engine costs less to build than an overhead valve engine.

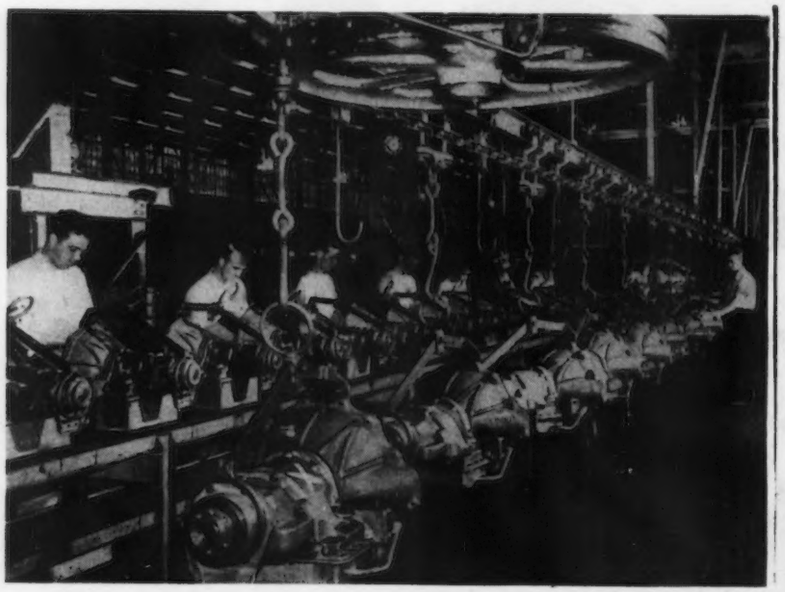
In addition to being in the forefront in high compression engines, Hudson engineers are claiming the following advances in engine design: (1) the first fully balanced crankshaft, (2) introduction of aluminum alloy pistons as early as 1921, (3) first use of chromium alloy blocks, (4) the first "pinned" rings in American-built cars and (5) the first use of dual carburetion in a six cylinder car.

Asked about 100 octane fuel availability, Stuart C. Bates, executive vice-president, said this development may be as much as 20 years away. The average gas at your neighborhood gas station today is about 81 octane, Mr. Bates explained. It will cost a lot of money to equip the petroleum industry to produce 100 octane gas, he said, and the percent of recovery from crude will be low.

As emphasized by Mr. Bates during the press conference, the motorist is really, in the final analysis, forced to choose between the reciprocal properties of performance and economy. The present Hudson engines, he said, emphasize performance. If economy is sought, he said, a change in axle ratio and the installation of overdrive will provide important fuel savings to the motorist.

Having already committed itself to the Kettering-type high compression engine, in which economy rather than performance has been emphasized, it is expected that GM will continue to introduce new overhead valve-type high compression engines as rapidly as fuel developments and the prospect for amortizing tooling costs appear to justify a change. Meanwhile, it will be interesting to see how many other car producers, excepting GM, follow the example of Hudson in increasing the compression ratio of their L-head engines. At present the following cars other than GM are using L-head engines: Hudson, Packard, Chrysler, DeSoto, Nash '600,' Plymouth, Studebaker, Willys, Ford, Lincoln-Mercury and Kaiser-Frazer.

PRODUCTION RATE CLIMBING: *Shown in the photograph is a recently installed assembly line and conveyors at the Buick plant in Flint designed to produce Dynaflow automatic transmissions. The newly installed line permits production at the rate of* 1200 *units per day. More than* 200,000 *units have been completed since production was started* 15 *months ago.*



Heads Great Lakes Steel Metallurgical Control

Detroit

• • • **Great Lakes Steel** Corp. has appointed an assistant vice-president in charge of metallurgical control. The well-deserved promotion went to Hubert C. Smith, chief metallurgist of the company since 1943. Mr. Smith joined Great Lakes in 1936. He is a graduate of Case School of Applied Science and was formerly associated with Otis Steel Co.

Mr. Smith has been active in the SAE in Detroit and the American Iron & Steel Institute. During the war, he served as special consultant to the Army Ordnance Dept. He visited the newly-captured steel facilities in Europe immediately following the war.

Production Record for GM

Detroit

• • • **During May General Motors** produced 265,280 passenger cars and trucks, thereby establishing a new monthly record.

GM's previous peak production was 262,628 units produced during April 1941.

General Motors' officials have recently disclosed that production is currently at capacity in GM plants throughout the country. Estimated capacity of the GM plants is 12,500 cars a day.

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Washington . . .

EUGENE J. HARDY

• Planners set back by Mr. Byrnes speech . . . Economic Expansion Act analysis reveals dangers . . . Proponents using every trick to muster support.

WASHINGTON — Recent charges by former Secretary of State, James F. Byrnes, that the Truman Administration is "going down the road to stateism" have considerably dulled the hopes of administration planners regarding early Congressional action on such collectivist measures as the Economic Expansion Act of 1949.

In an address at Washington and Lee University, Mr. Byrnes struck at the pessimistic attitude of the planners regarding the future of the American economy. He declared: "We face no collapse of our economy. We should not have a serious depression. But it is time for us to take stock. Striking at deficit financing as a threat to business stability, he declared that "the only wise course is to reduce expenditures and live within our income."

"The financial problems that beset us," he continued, "will not be entirely without compensation should they cause the abandonment of some of the new programs suggested, which point inevitably to a welfare state. That would not only save money but would preserve liberty."

Lashing out at all demands for special privileges, Mr. Byrnes stated that "too many people want more pay for less work." He did not spare any of the major political parties, but pointed out that each of them are trying to outpromise the other. Emphasizing that power once transferred to government is difficult to recover, he stated that "we are not only transferring too much power from the individual to the government, but we are transferring too many powers of state governments to the federal government."

Coming from a distinguished Democratic elder statesman who went down the line for the original New Deal while serving in the House and Senate, and who later served President Roosevelt as Director of War Mobilization and Reconversion after stepping down from the Supreme Court and then moved into President Truman's cabinet as Secretary of State, his views did not go unnoticed on Capitol Hill.

ON the floor of the Senate last week, Mr. Byrnes' address was acclaimed by both Democrats and Republicans with the exception of the extreme left-wing group led by Senator Pepper, D., Fla. The Florida Senator attempted to discredit Mr. Byrnes by denouncing him as something less than a full supporter of the Democratic party, associating him with big business, and applying a mild smear brush. A not uncommon technique in the left-wing group, it made little impression on the Senate.

It is significant, perhaps, that Senator Pepper is one of the sponsors of the Economic Expansion Act, which would give the federal government powers over the national economy almost without parallel even in times of war, certainly far greater than any of the legislation which Mr. Byrnes strongly supported in the early days of the New Deal. Other sponsors of this bill are such self-appointed liberals as Democratic Senators Murray, Mont.; McMahon, Conn.; Kefauver, Tenn.; Humphrey, Minn.; Sparkman, Ala.; and Kilgore, W. Va. On the House side its present backers are Representative Wright Patman, D., Tex., and Representative Helen Gahagan Douglas, D., Calif.

The measure has not yet been introduced, but copies have been circulated throughout the country for comment. It does not yet bear White House approval and there are no plans to act on it during the present session of Congress.

A REWRITE of the earlier Spence Bill, which was designed to combat inflation, many of its provisions are the same even though its purpose is allegedly deflationary. Its leading proponent, Senator Murray, declares that the bill is a natural followup to the Full Employment Act of 1946, which at the time it was passed was criticized on the grounds that it opened the door to continuing government intervention into economic matters. It appears that these fears were well grounded.

The bill declares that it is the responsibility of the federal government along with capital, labor and agriculture to promote maximum employment, production and purchasing power. Its goal is to increase total national production by a minimum of 3 to 4 pct each year and provide 500,000 to 750,000 new jobs yearly through proper use of labor and materials.

To attain these goals all sorts of government aid and intervention are provided for in the measure. For example, the President could order expansion in any of the following industries, specifically named in the bill, steel, freight cars, iron ore (including taconite), manganese, and chromite, copper, lead, zinc, bauxite and aluminum, synthetic fuels, electric power, fertilizer, timber and newsprint. The President could also recommend to Congress expansion of other industries, if

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the production goals were not adequate.

THE bill also provides for accelerated amortization, credit insurance, loans to small business, research contracts, encouragement of private investment in regional development, advance public works planning, and a continuing investigation of monopolistic practices.

In addition, the government would be empowered to contract for rehabilitation of idle war plants and to construct facilities for sale or lease to private business for the production of steel, synthetic fuels, freight cars and fertilizer. The government could also purchase the following materials abroad: iron ore, manganese, chromite, copper, lead and zinc. These materials would be resold, primarily to small business, to promote investment and meet production needs.

While the bill will probably not come up before Congress for debate before adjournment for the summer, its proponents are doing a very cute job of mustering support for the bill. For example, to gain public support the only materials specifically mentioned in the bill are those which have been widely discussed in recent years for a variety of reasons. They were undoubtedly carefully selected. Some of them such as steel, aluminum, and freight cars have recently been in extremely short supply. Manganese and chromite have been in the headlines due to Russian threats to cut off exports.

LEGISLATION calling for subsidies for domestic producers of copper, lead and zinc is now before the Congress. Iron ore has been limelighted due to the many conflicting reports regarding the adequacy of domestic reserves. Synthetic fuels are a relatively new development and legislation is before the Congress to provide government aid for construction of commercial plants. Such plants require tremendous sums and with a tight investment market the petroleum industry would be hard put to finance such a development.

In other words, the left-wing strategists are using a "divide and conquer" theory to muster support for the bill. Individual portions of the measure will appeal to some segments of industry and other portions, such as that calling for accelerated amortization might receive rather widespread support from industry generally. This individual support would then be wrapped together to show overall support for a very dangerous piece of legislation.

An illustration of how this theory is being put to work can be gleaned from some of the letters received by Senator Murray in response to his requests for comments. The National Assn. of Manufacturers, for example, considering the bill as a whole, told Senator Murray that "this bill, if enacted, would bring the practical decisions of business and of the consuming public under excessive government regulation and would interfere with the cardinal principle of freedom of choice and action. Furthermore, it would seriously impair incentives. Consequently, the measure would not produce the stated aims of increased investment and production, but on the contrary, would have just the opposite effect.

But Mr. Arthur B. Rathbone, Oglebay Norton & Co., commenting on only three portions of the bill, gives Senator Murray substantial support for two of these portions. Mr. Rathbone stated that "our interest in the act is limited to what assistance may be given for the development of taconite ore in the Lake Superior District." Citing the high cost of beneficiation plants, he emphasized that the accelerated amortization provisions of the act "should be offered to the operators of taconite plants."

IN relation to the loan provisions of the bill, Mr. Rathbone states that "we believe the interest rate on any long-term loan of this nature should be in the neighborhood of 2½ pct." He adds that the provisions of the bill calling for interest rates not in excess of 4 pct "are satisfactory and we would, of course, be very willing to explain our reasons why a lesser interest rate should apply for the development of taconite ores. Likewise, we feel that a 20-year loan is not long enough in the case of taconites. . . . My personal suggestion would be to make long-term loans payable on a production basis because it takes at least 4 or 5 years to build one of these plants."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHY, THAT CHIP HAS COME CLEAR ACROSS TH' SHOP WITHOUT BREAKING OFF! WHAT A QUEER COINCIDENCE!
RIGHT UP UNDER TH' BULL'S ARM, TOO! HOW STRANGE!
I BET TH' BULL WILL ALWAYS BELIEVE IT'S AN INSIDE JOB--THAT ONE O' THEM BOSSES GAVE IT A LITTLE GUIDING TOE SHOVE SO IT WOULD GO UP UNDER HIS NOSE LIKE THAT!
SUSPICIOUS CHARACTERS
J.R.WILLIAMS
7-1
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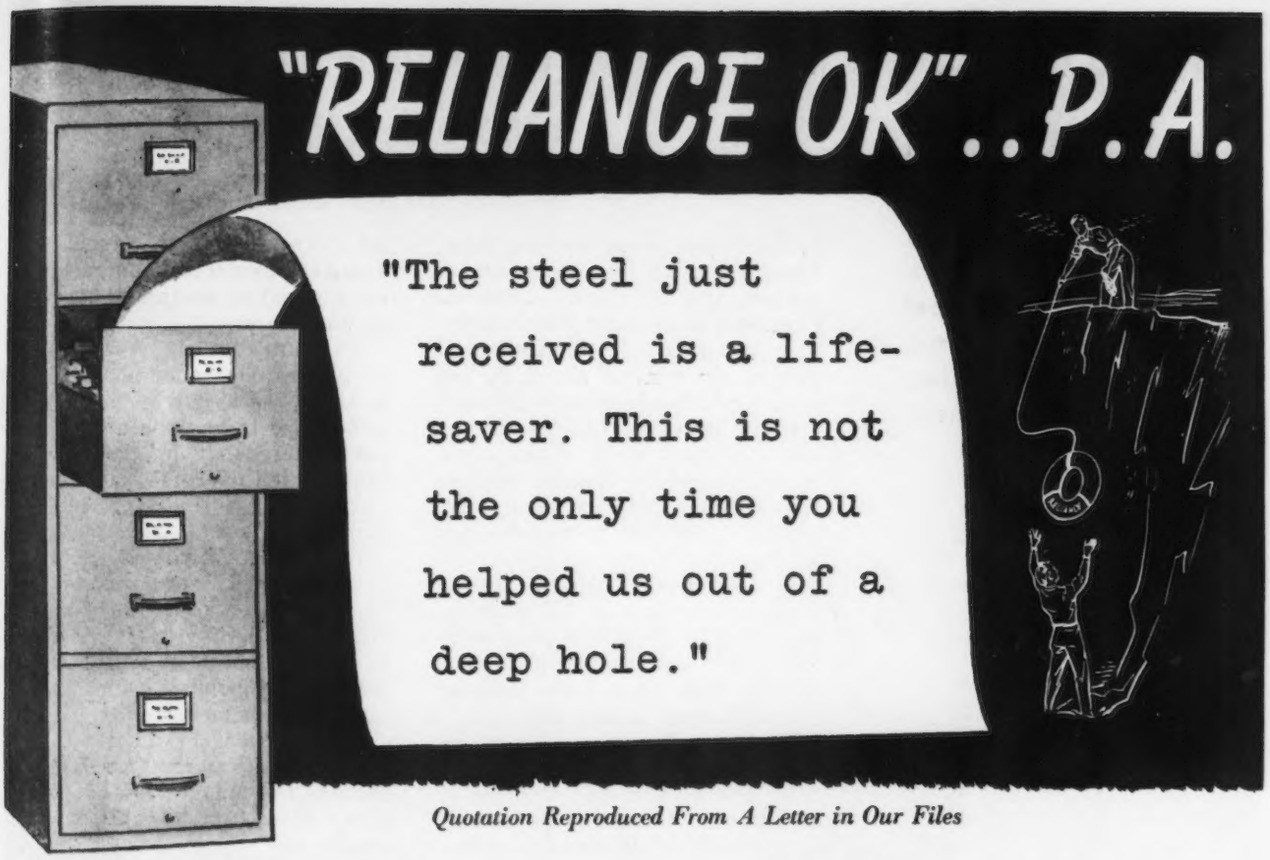

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West Coast . . .

ROBERT T. REINHARDT

• Wholesalers of steel and plumbing supplies have troubles . . . Aircraft industry looks more inviting to steel producers . . . New openhearth pit lighting tried out at Bethlehem Pacific.

SAN FRANCISCO—Two hazards of wholesale distribution —labor demands and federal laws—were causing a lot of headaches in the San Francisco Bay area last week. Those steel warehouses here employing CIO labor closed early last week as members of the International Longshoremen & Warehousemen's Union struck for higher wages in what many observers believe will prove a futile gesture.

In this slow market the approximate one half warehouses in the area still open are adequately supplying needs of less than carload lot buyers and in a few instances some of the local warehouses closed by the strike and who have branches elsewhere are trucking materials to local customers. The AFL operated warehouses have been unaffected and business is "as usual"—generally very slow.

Approximately 6000 warehousemen are on strike with other craftsmen seriously affected by the walkout, which covers members of the Distributors Assn. of Northern California which has approximately 200 warehouses in its membership.

Wholesalers of all materials are watching with considerable interest the criminal proceedings brought last week by the Anti-Trust Div. of the government against the Northern California Plumbing & Heating Wholesalers' Assn. alleging that 15 members of that group control about 90 pct of the wholesale plumbing business in northern California and are guilty of price fixing, uniformly adopting freight charges and delivery charges and have agreed to use certain published prices.

In addition to naming the 15 separate members of the trade association, 14 officials of those companies and one member of a partnership firm have been indicted by the Federal Grand Jury.

The San Francisco companies named are: Grinnell Co. of the Pacific; Pacific Can Co.; Thomas F. Smith, Inc.; Coast Pipe & Supply Co.; Crane Co.; Dallman Co.; Dalziel Plumbing Supplies; P. E. O'Hair & Co.; and Tay-Holbrook, Inc. Also named were Slakey Bros., Inc., Sacramento; Delta Pipe & Supply Co., Stockton; Western Supply Co., Ltd., San Jose; and Heieck & Moran Plumbing Supplies, Oakland.

Early in the hearings two vice-presidents of two of the defendant companies were charged with perjury.

Each company found guilty of violating the Sherman Act is liable to a maximum fine of $5000 and each individual named is liable to a similar fine plus 1 year in jail or both.

A similar case is now pending in Los Angeles although in that instance the action is a civil suit wherein an injunction is sought to prevent the use of a common published price list.

•

Steel Producers Eye Aircraft Industry As Large Users of Steel

Los Angeles

• • • **With competition** stiffening, southern California steel producers today are looking upon the aircraft industry with new interest. With new government money available as the fiscal year changes, numerous contracts are anticipated by southland airframe manufacturers.

The total amount of steel used in planes has remained a secret in many cases, but in the main, it is believed to have been increased per square foot in the postwar craft which operate under terrific strain flying in the 500 to 800 mph range.

Somewhat typical of what aircraft contracts mean in the way of steel purchases are the F-86 Air Force fighter being produced by North American and the B-45 medium jet bomber being turned out by the same company.

In the frame of the F-86, 1724 lb of steel are used. This does not include the amount in the jet engines where considerably more is employed.

Broken down for the frame, this means that there will be 307 lb in steel bars, 142 lb in tubing, 1204 lb in sheets and 71 lb in forgings. Overall gross weight of the F-86 with the engines and ready to fly is listed at 13,715 lb.

The ship is of postwar design with a swept-back wing. It holds the official world's speed record of 670 mph although one model was timed unofficially on a run from Wright Field in Dayton to an East Coast city at an average of 710 mph.

The larger B-45 is designed to carry a 10-ton bomb load 800 miles. With its four jets and peculiar side cells, it is rated capable of carrying atomic bombs.

The B-45 carries into the air 6629 lb of steel on each flight. This includes 1667 lb in steel bars, 905 lb in tubing, 3773 lb in sheeting and 284 lb in forgings.

Currently, North American has orders for 554 of the fighters and 139 of the bombers, with the Air Force the only customer in both cases.

North American also is beginning production of the AJ-I for the Navy, the first plane for the fleet service designed to carry an atomic bomb. A few models are now flying.

Last week Douglas Aircraft Co.

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flew its first 1949 model of the famed DC-3 which has been labelled "Super DC-3" which has increased power, speed and capacity. Douglas is prepared to carry out a modernization program on existing commercial DC-3s and the military form, C-47. Cruising speed of the improved model is 243 mph with the 1475 hp Wright 1820-C9 HE engines and slightly less with the 1450 hp Pratt & Whitney R-2000 engines. Top speed is reported to be 270 mph with either engine. Super DC-3s can be outfitted in various interior arrangements to seat from 30 to 38 passengers instead of the 21 passenger capacity currently in use.

It is reported that more than 10,000 DC-3s were turned off of war time production lines and that this particular ship has probably carried more people and has been more places than any other aircraft produced.

•

Plants Continue Expansion

Los Angeles

• • • **An almost steady** increase in expansion of steelworking plants in this area was confirmed again in May building permits indicating that Pioneer Steel Co. was adding 10,000 sq ft of production space, South Gate Iron Works was erecting a new building for light structural fabrication and Metal Engineering Co. was adding a 3000 sq ft building.

General Motors Corp. is adding an 8000 sq. ft. warehouse to its Chevrolet plant in nearby Van Nuys.

•

New Lighting for Mill

San Francisco

• • • **Installation** of a new mercury vapor lighting system which is expected to double the lighting and provide additional safety for employees, is now nearing completion in the roof of the openhearth pit building at Bethlehem Pacific Coast Steel Corp.'s South San Francisco plant. The new lamps, which will eliminate shadows on the pit floor and thereby reduce the probability of accidents, deliver a constant output of 1000 w throughout their entire life.

Although this new lighting installation is not yet completed, it has already done away with the necessity for lights on the openhearth pit walkway, as the vapor lamps in the ceiling alone furnish the required illumination on the floor of the pit.

The new lights are said to be unaffected by building vibration or heat shock and their life is approximately 15 times longer than that of an incandescent lamp. Maintenance has been greatly simplified and operating efficiency has been improved according to company spokesmen.

TESTING: *That spark flashing between the two spheres in the center of this picture has* 140,000 *volts behind it. The sphere gap is used to set the test equipment at the desired voltage in the Sunnyvale, Calif., plant of the Westinghouse Electric Corp. The gap is then increased and the* 140,000-*v current is applied to the transformer for* 1 *min.*

Geneva Plate Rolling Mill Operates at Capacity

Salt Lake City

• • • **Geneva Steel Co.** is still operating at between 70 and 75 pct of ingot capacity, with one of three blast furnaces and three of nine openhearths down. A continuing brisk demand for plate is keeping the plate rolling mill at capacity operation. But the demand for structural shapes is approaching the vanishing point.

Fabricators of the area are generally operating at high levels but a substantial part of this business is completing orders which were placed on the books some time ago. According to sources in the trade, there will be a slackening shortly unless new orders pick up.

There has been little change in the nonferrous metals picture during the past few weeks. All but a few mines are still operating, hoping for an improvement in prices or some congressional action to avert widespread shutdowns. But deep-mine operators are getting ready to cut back and the next few weeks will bring sharp declines unless something comes to the rescue.

Several mining companies in this area have already asked employees to accept wage cuts of from $1.96 to $2.50 per day, but without success.

•

Ceases Mill Operations

Tacoma, Wash.

• • • **With the bottom** having dropped out of the conversion market and demand for ingots for rolling practically nonexistent, the Rainier Steel Corp. here has ceased operations.

Last year when steel was in short supply, Eugene Cunningham installed a second-hand electric furnace rated at a capacity of approximately 36,000 tons of ingots per year, but power shortages and initial production difficulties prevented this operation ever reaching that rate. It was also found that some of the contracts for ingots upon which the company was relying per volume were far from firm and cancellations followed.

Bethlehem Pacific has purchased the company's ingot molds and all facilities are for sale either as a complete unit or piece-meal.

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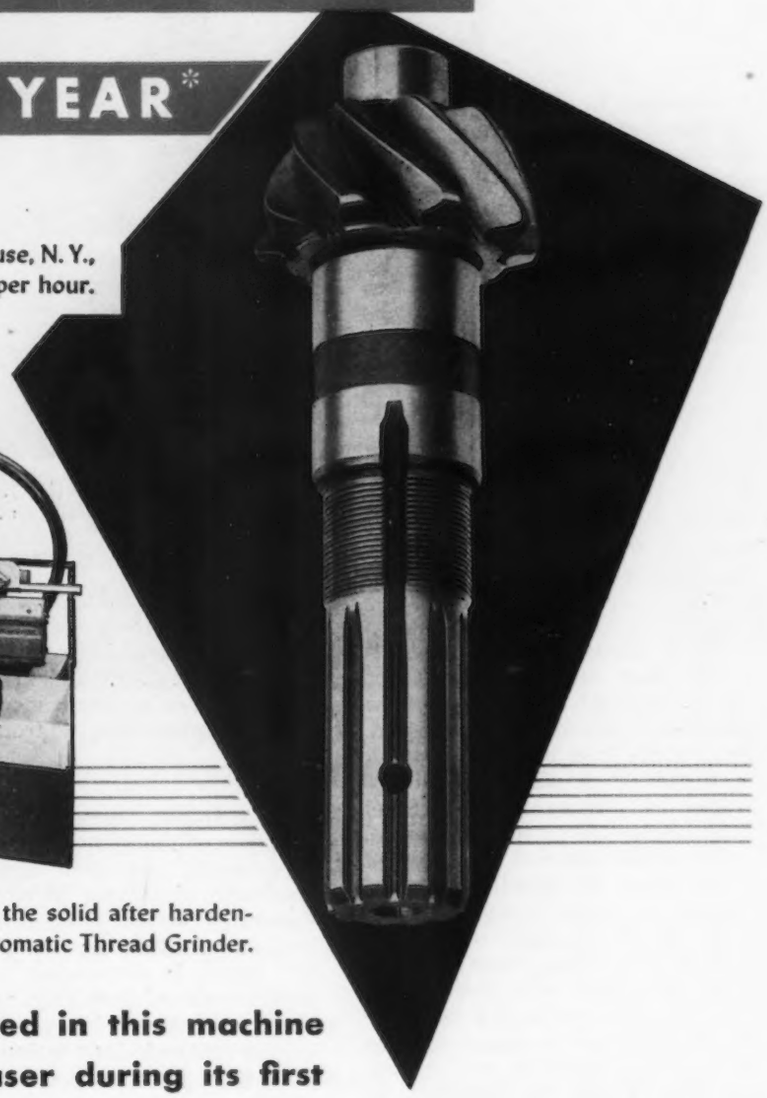
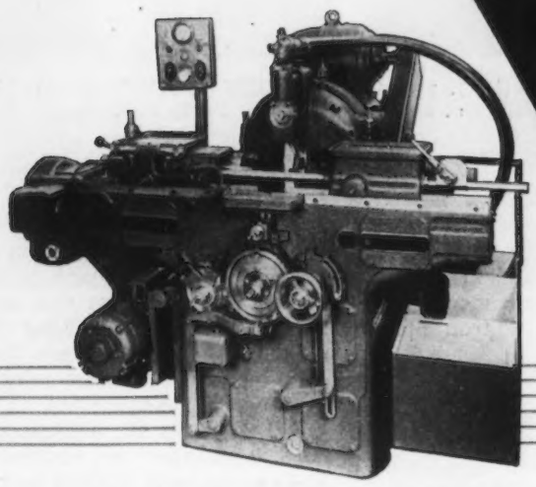
THE FIRST YEAR*

The New Process Gear Corp., Syracuse, N. Y., threads 80 of these drive pinions per hour.





The threads are finish ground from the solid after hardening, on a 6 x 15" Jones & Lamson Automatic Thread Grinder.

110% of the funds invested in this machine returned to the purchaser during its first year of operation.

*The piece was completely machined, including the keyway in the thread diameter before hardening. A 6 x 15" J & L Automatic Thread Grinder, using a multi-rib wheel, grinds the thread from the solid, hardened pinion in two revolutions of the work piece, plus the feed-in and lap-over. Scrap was reduced 50%. The savings (based on a daily production of 700 units) in direct labor costs, overhead and gage cost, *paid for machine and equipment in 11 months.*

A survey of your turning, threading and inspection operations by our engineers, might well produce comparable results for you. Write to Dept. 710 G

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PERSONALS

° ° °

• **Clarence E. Searle,** formerly president of Worthington Pump & Machinery Corp., Harrison, N. J., since 1945, has been made vice-chairman of the board and continues as chairman of the corporation's management committee. **Hobart C. Ramsey** has been named president. Mr. Ramsey had been executive vice-president since 1945. **Edwin J. Schwanhausser** has been appointed executive vice-president and **John J. Summersby,** vice-president in charge of sales. Mr. Schwanhausser had previously served as vice-president in charge of sales. Mr. Summersby had been serving as assistant vice-president and general sales manager.

• **Hal P. Kibbey** has been appointed assistant director manager of the U. S. Steel Supply Co.'s new concrete reinforcing bar division. Mr. Kibbey had been a salesman in the division when it was operated by Carnegie-Illinois Steel Corp. and prior to that served 12 years in the concrete bar division in the Gary and South Works of Carnegie-Illinois. **Gregg A. DeLong,** formerly assistant to the manager, specialty products division, Pittsburgh sales department of Carnegie-Illinois, has been appointed assistant manager of sales for the new division of the Supply Co. **Frank M. Waddell** in Cleveland and **Everett C. Hunt** in Boston have been made assistant managers of the new division in those districts. **Charles Wilson** has been named a sales engineer in St. Paul and **William Donovan** has been appointed in the same capacity in Pittsburgh.

• **W. E. Bittner,** director of purchases for the past eight years for Diamond Alkali Co., Cleveland, has been elected vice-president, purchases. Mr. Bittner has been with the company since 1916.

• **C. Dean Lowry,** vice-president, has been elected president, Sioux Metal Products Co., Bedford, Ohio.

• **Roy E. Wilson** has resigned as assistant advertising manager of Wheeling Steel Corp., Wheeling, W. Va.

HOBART C. RAMSEY (left), president and JOHN J. SUMMERSBY (right), vice-president in charge of sales, Worthington Pump & Machinery Corp.

• **J. Tedford Bachman** has been appointed general manager of sales, Cold Metal Products Co., Youngstown. Mr. Bachman had formerly been assistant vice-president of operations, Sharon Steel Corp.

• **R. A. Quadt,** formerly assistant manager of the general aluminum department, has been appointed director of aluminum development, Federated Metals Div., American Smelting & Refining Co., Detroit. Mr. Quadt is responsible for the development of Tenzaloy, and has spent a number of years in aluminum research. He continues this activity in his new position.

• **Frank K. Metzger** has been appointed general sales manager, the Midvale Co., Philadelphia. Mr. Metzger had been manager of railroad sales since 1946 and prior to that had held executive positions with the Baldwin Locomotive Works and its subsidiary, Standard Steel Works.

• **L. A. Young** has retired as chairman of the board, president and director of L. A. Young Spring & Wire Corp., Detroit. **Grant L. Cook,** formerly vice-chairman, has been elected chairman of the board and **N. D. Ely,** formerly executive vice-president, has been appointed president. **Mrs. Ola Young** has been appointed to fill the vacancy on the board created by the retirement of Mr. Young.

• **Cecil M. Peter** who has been general sales manager of the Fellows Gear Shaper Co., Springfield, Vt., for nearly 11 years, has been named vice-president and general manager. **Leroy C. King** for a number of years eastern district sales manager, becomes sales manager with headquarters in New York. **Herbert W. Nickerson** has been appointed to succeed Mr. King as eastern district manager. **Fred Pauling** has been appointed assistant to Mr. Nickerson with headquarters in New York. **Ralph Lane** has been named to succeed Mr. Pauling as representative in the Boston area. **Ralph Aiken** has been appointed to succeed Mr. Lane in the Syracuse territory. **George Sanborn** has been made manager of the Detroit office, retaining his title of chief field engineer. **Frank Sanborn** has been appointed salesman on the West Coast with headquarters in Los Angeles. **Carl Rice** has been appointed to succeed Frank Sanborn as assistant to George Sanborn in field engineering.

• **Charles V. Nicholson** has been appointed manager of export sales of Henry Disston & Sons, Inc., Philadelphia, succeeding **A. Stewart Hunt,** who has retired.

• **Robert J. McKenna,** formerly vice-president of Storms Drop Forgings Co., Springfield, Mass., has become associated with the Billings & Spencer Co., Hartford, as New England representative.

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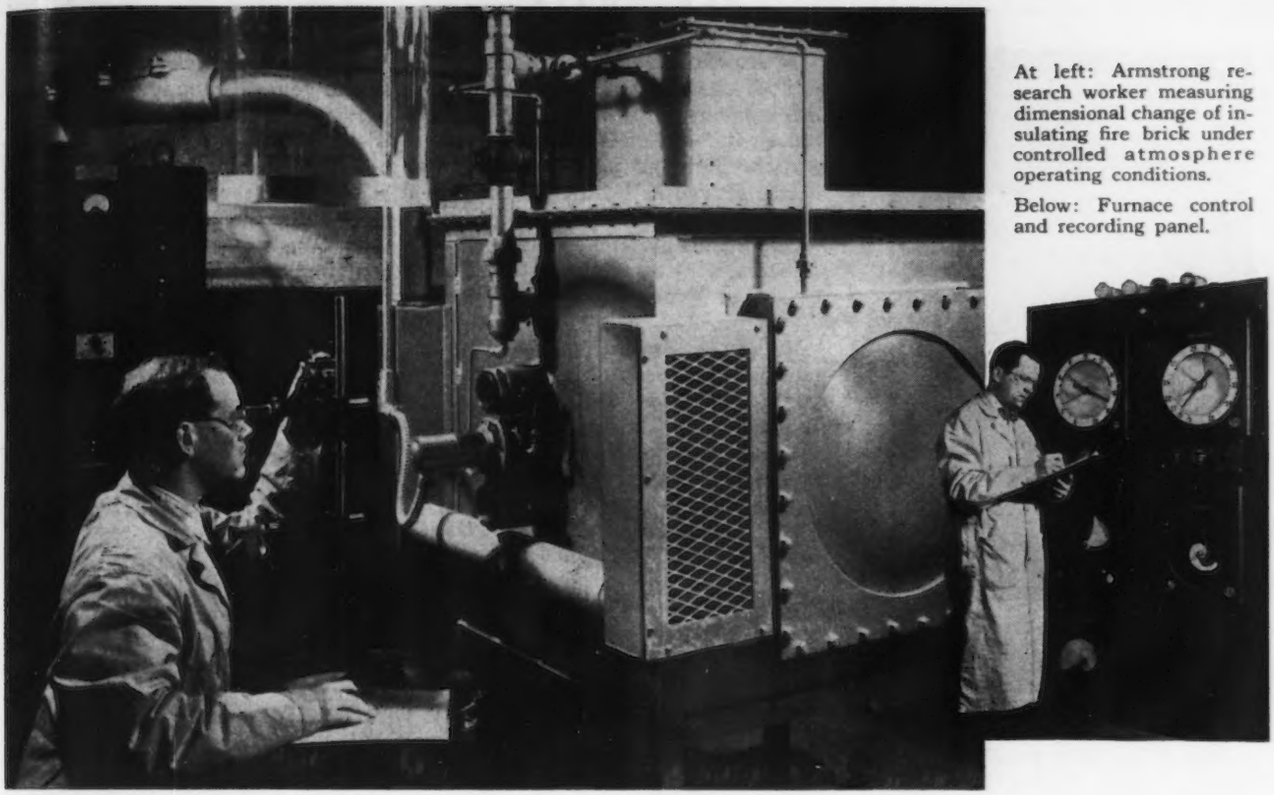

At left: Armstrong research worker measuring dimensional change of insulating fire brick under controlled atmosphere operating conditions.

Below: Furnace control and recording panel.

Controlled Atmosphere Test Furnace Helps Solve Insulating Refractory Problems

One of the urgent needs of the furnace building industry today is for more information on the effects of controlled atmospheres on insulating fire brick. To find the answers to the many questions being asked, Armstrong research scientists have designed and built a unique testing furnace. Here they can simulate any commercial atmosphere condition.

A comprehensive, long-range testing program is already under way to determine the effects of endothermic, exothermic, and dissociated ammonia gases on insulating fire brick and refractory cements. Studies are also being conducted to provide users of Armstrong's Insulating Fire Brick with the answers to specific questions on individual special atmosphere furnace problems.

This furnace is designed not only to test single brick specimens but also the performance of entire wall or arch constructions. Tests can also be made on the effects of insulating fire brick linings on the controlled atmospheres used.

This new furnace is an important addition to the many units of modern research equipment used daily to guard the quality of Armstrong's Insulating Fire Brick and refractory cements and to develop and test new products and uses.

For assistance in the solution of any problem involving the use of insulating fire brick and refractory cements, call the Armstrong office nearest you or write directly to Armstrong Cork Company, 4906-A Mulberry Street, Lancaster, Pennsylvania.

ARMSTRONG'S INSULATING REFRACTORIES

STANLEY E. PETERSON, vice-president and secretary, Whiton Machine Co.

• **Stanley E. Peterson** has been promoted to vice-president and secretary and **Walter E. Beaney** has been made vice-president and factory manager, the Whiton Machine Co., New London, Conn.

• **Ellsworth E. Kimmel** has joined Koppers Co., Inc., Pittsburgh, as assistant to the technical adviser for the chemical division. Mr. Kimmel comes to Koppers from the Interlake Chemical Corp. where he had been manager of the research laboratory for coal chemicals and synthetic resins.

• **J. Howard Dunn** has been appointed assistant manager of the development division of the Aluminum Co. of America's Cleveland branch. For the past four years he has served as head of the highway transportation section of the development division, with headquarters at New Kensington, Pa. Mr. Dunn joined Alcoa in 1934.

• **Robert A. Specht** has been appointed manager of a new heat transfer division of the National Radiator Co., Johnstown, Pa., with headquarters in New York. Mr. Specht has been with National Radiator for several years as eastern sales representative for the industrial division.

• **W. R. Patterson** has been appointed general superintendent of the steel department at the Torrance, Calif. plant of the National Supply Co., Pittsburgh. Mr. Patterson, who has been with the company since 1936, also continues in his present capacity as chief plant metallurgist, which position he has held since 1943.

• **Edmund B. Neil,** consulting engineer, Columbus, Ohio, has again been named midwest associate of **Francis W. Davis,** consulting engineer of Waltham, Mass. Mr. Davis had formerly been associated with Mr. Neil in research and development work at the Pierce-Arrow Motor Car Co., Buffalo.

TOMLINSON FORT (left), manager, Apparatus Sales Dept. and WILLIAM W. SPROUL (right), sales manager, industrial products, Westinghouse Electric Corp.

• **Francis K. McCune,** assistant to the general manager of the apparatus department of General Electric Co., Schenectady, has been appointed assistant general manager of the nucleonics department, with headquarters at Richland, Wash., where that department operates the Hanford Works for the Atomic Energy Commission. Mr. McCune began his career with General Electric in 1928. **A. E. Rowe** has been appointed assistant manager of the ballast sales division of the specialty transformer and ballast divisions. Mr. Rowe has been with the company since 1946 when he started as a sales engineer.

• **E. M. Cabaniss** has been appointed president of Joseph Dixon Crucible Co., Jersey City, and **J. H. Schermerhorn** has been elected chairman.

• **J. E. Keogh** has joined the sales department of the brass rolling mill division of Plume & Atwood Mfg. Co., Waterbury, Conn. Mr. Keogh had previously been sales representative with George Keenan & Co.

• **Gerald A. Fleet** has been appointed district manager for the American Well Works, Aurora, Ill., serving the New York district, including the metropolitan area, northern New Jersey and southeastern New York.

• **Tomlinson Fort** has been appointed manager, apparatus sales department, Westinghouse Electric Corp., Pittsburgh, succeeding James H. Jewell who has recently been made vice-president in charge of sales. Mr. Fort had formerly been manager of central station sales activities. He has been with Westinghouse since 1923. **William W. Sproul** has been made sales manager, industrial products. He has served since 1944 as sales manager for the transformer division of the company in Sharon, Pa. Mr. Sproul joined Westinghouse in 1927. **Royal C. Bergvall** has been appointed engineering manager, industrial products. Mr. Bergvall has had 28 years of engineering experience with the company and for the last 11 years has served as assistant to the vice-president in charge of engineering.

• **Warren M. Pike** has been appointed New England representative in Boston to handle the sale of gears and gear units manufactured at the Buffalo plant of Farrel-Birmingham Co., Inc., Ansonia, Conn.

• **R. N. Chapin** has been appointed general purchasing agent, Air Reduction Sales Co., New York, succeeding **Walter R. Clark,** who has resigned from Air Reduction to join U. S. Industrial Chemicals, Inc., as head of their purchasing department. Mr. Chapin, who joined Air Reduction in 1935 had been assistant purchasing agent since 1945.

• **Peter R. C. Jarratt** has been named sales representative of the San Joaquin Valley, Calif., territory and **Paul W. Belvel,** sales representative in the San Francisco peninsula area for Taylor & Spottswood, steel warehouse, San Francisco. Mr. Jarratt had formerly been associated with Great Lakes Steel and Central Steel. Mr. Belvel had formerly been an inside salesman at Tayler & Spottswood.

• **Allan Wigle** has been named general plant manager of L. A. Cohn & Bro., Inc., Chicago.

• **John F. Murray** has been appointed general manager of the Balboa Pacific Corp., an ATF Inc., affiliate, Fullerton, Calif. He has been chief plant engineer of the Daystrom Corp. at Olean and Friendship, N. Y. Mr. Murray joined American Type Founders in Elizabeth, N J. in 1939 as a tool designer and was later made plant manager of the ATF small arms division at Fitchburg, Mass.

• **James K. Sutherland,** manager of steel operations, has been made responsible for direct supervision of the blast furnaces and coke ovens in addition to his previous responsibilities for the open-hearth, electric furnace and steel mill operations at the Rouge Div., Ford Motor Co., Dearborn. **D. L. Newkirk,** manager of the blast furnaces and coke ovens, supervises operations of these activities. **W. J. Reilly** has been named manager of the steel mill, supervising operations of the open-hearth and electric furnaces and of the steel mills.

• **P. L. Henry** has been appointed chief industrial engineer and **Lloyd Miller,** production manager, Sharon Steel Corp., Sharon, Pa. Mr. Henry joined Sharon in 1925 and was appointed production manager in 1946. Mr. Miller joined Sharon in 1917 when that company acquired Youngstown Iron & Steel Co. He was later appointed manager of the order department, which position he continues to occupy.

• **W. H. Lamb** has been appointed general manager of the newly created television tube division of Sylvania Electric Products, Inc., with headquarters in Seneca Falls, N. Y. Mr. Lamb has been continuously associated with the company's electron tube production since 1933 and had been general manufacturing manager for television tubes. **Louis H. Niemann,** formerly assistant purchasing agent for the radio division of the Philco Corp., has joined the sales staff of Sylvania as special sales representative.

• **Samuel F. Rolph** has been appointed general manager of the Sager and Barrows Lock Works divisions in North Chicago, Ill., of the Yale & Towne Mfg. Co., New York, succeeding **George J. Macklin,** who resigned. Mr. Rolph continues as general manager of the company's Norton Door Closer Co. division in Chicago, to which position he was appointed in 1947.

ROGER W. BATCHELDER, vice-president in charge of sales, National Bearing Div., American Brake Shoe Co.

• **Roger W. Batchelder** has been appointed vice-president in charge of sales of the National Bearing division of American Brake Shoe Co., New York, with headquarters in St. Louis. Formerly assistant to the president of National Bearing, Mr. Batchelder has been with Brake Shoe since 1933.

• **Fred J. Bieber** has been elected a director of Casco Products Co., Bridgeport, Conn., where he is works manager. Mr. Bieber had formerly been associated with Scovill Mfg. Co.

JAMES K. SUTHERLAND (left), manager of steel operations and W. J. REILLY (right), manager of steel mill, Rouge Div., Ford Motor Co.

BRADFORD T. BLAUVELT, comptroller, ATF, Inc.

• **Bradford T. Blauvelt** has been appointed comptroller of ATF Inc., Elizabeth, N. J. Mr. Blauvelt has been a vice-president and director of American Type Founders, Inc., and of American Type Founders Sales Corp., and continues in those posts.

• **F. J. Burd** has been appointed manager of the newly-established Gary, Ind. sales office of the Chicago sales district of Cutler-Hammer, Inc., Milwaukee. **H. Kolar,** formerly in the electrical engineering department of the South Chicago Works of Carnegie-Illinois Steel Corp., has been appointed to assist in handling sales work in the Gary area.

• **J. C. Vaught,** formerly coordinating engineer with George Koch Sons, Inc., Evansville, Ind., is now connected with Futura, Inc., in that city, as sales engineer for the industrial division.

• **George J. Albright, Jr.,** has been appointed district sales representative of the Baker Industrial Truck division, Baker-Raulang Co., Cleveland. Mr. Albright has his headquarters in Memphis, Tenn.

• **William D. Pomeroy,** a sales engineer for Snyder Tool & Engineering Co., Detroit, since 1944, has been appointed sales representative for New York, New Jersey, New England and Pennsylvania, with his headquarters in Seneca Falls, N. Y.

A. L. B. RICHARDSON, general attorney, Sylvania Electric Products, Inc.

• **A. L. B. Richardson** has been appointed general attorney for Sylvania Electric Products, Inc., New York. Mr. Richardson joined the legal staff of Sylvania in 1945 and was later made manager of the patent law department.

• **John A. Sullivan** has been made sales manager of the merchandising department of Jack & Heintz Precision Industries, Inc., Cleveland.

• **Sidney G. Whiting,** formerly assistant zone manager for Pontiac Motor division of General Motors Corp., has been appointed manager of the newly-established Charlotte, N. C., zone. Mr. Whiting has been with Pontiac for 15 years. **George D. Dennis,** formerly zone manager at Minneapolis, has been appointed manager of the newly-established Milwaukee zone. Mr. Dennis has been with General Motors 22 years, the last 15 of which were with Pontiac. **John T. Omtvedt** has been promoted from assistant zone manager to manager of the Minneapolis zone, succeeding Mr. Dennis. Mr. Omtvedt has been with Pontiac since 1936. **T. B. Lowery** has been appointed chief metallurgist of Pontiac Motors, succeeding **Z. T. Crittenden,** who died. **A. H. Robinson** has been promoted to assistant chief metallurgist.

• **Ora F. Metz,** district manager of Allis-Chalmers El Paso and Phoenix offices, retires, effective July 1, after nearly 43 years with the company. **John E. Despins** has been appointed manager of the El Paso branch and **W. C. Kinnon,** who had been manager of the Phoenix branch continues as manager of the new district office at Phoenix.

OBITUARY...

• **J. J. Freney,** 46, industrial division manager, apparatus sales office, General Electric Co., Philadelphia, died recently.

• **Herbert J. Higgins,** 55, statistician, U. S. Steel Corp., New York, died June 19.

• **Carl G. Ohlson,** 67, vice-president, Aetna-Standard Engineering Co., Youngstown, died June 16.

• **Marinus Brink,** founder and president, Cleveland Cold Rolling Mills Co., Cleveland, died June 16.

• **W. Carroll Keenan,** superintendent of perations, General Electric Co., Cleveland, died June 16.

• **Charles E. Nelson,** 75, president, Nelson Iron Works, Seattle, Wash., died June 12.

• **Newton H. Slonaker,** 79, for more than 50 years secretary-treasurer, Hyde Park Foundry & Machine Co., Hyde Park, Pa., died June 17.

• **William A. Falls,** 57, president, Falls Spring & Wire Co., Detroit, died June 13.

• **John D. Hilliard,** 81, inventor, for many years associated with General Electric Co. and Allis-Chalmers Co., died June 19.

• **Ralph M. Bowman,** 65, purchasing agent, refractories and alloys division, Republic Steel Corp., Cleveland, died June 19.

• **Harvey D. McGray,** 79, retired contractor, Arlington, Mass., died June 11.

• **Thomas A. Brown,** 69, president and general manager, Brown Boggs Foundry & Machine Co., Ltd., Hamilton, Ontario, Canada, died recently.

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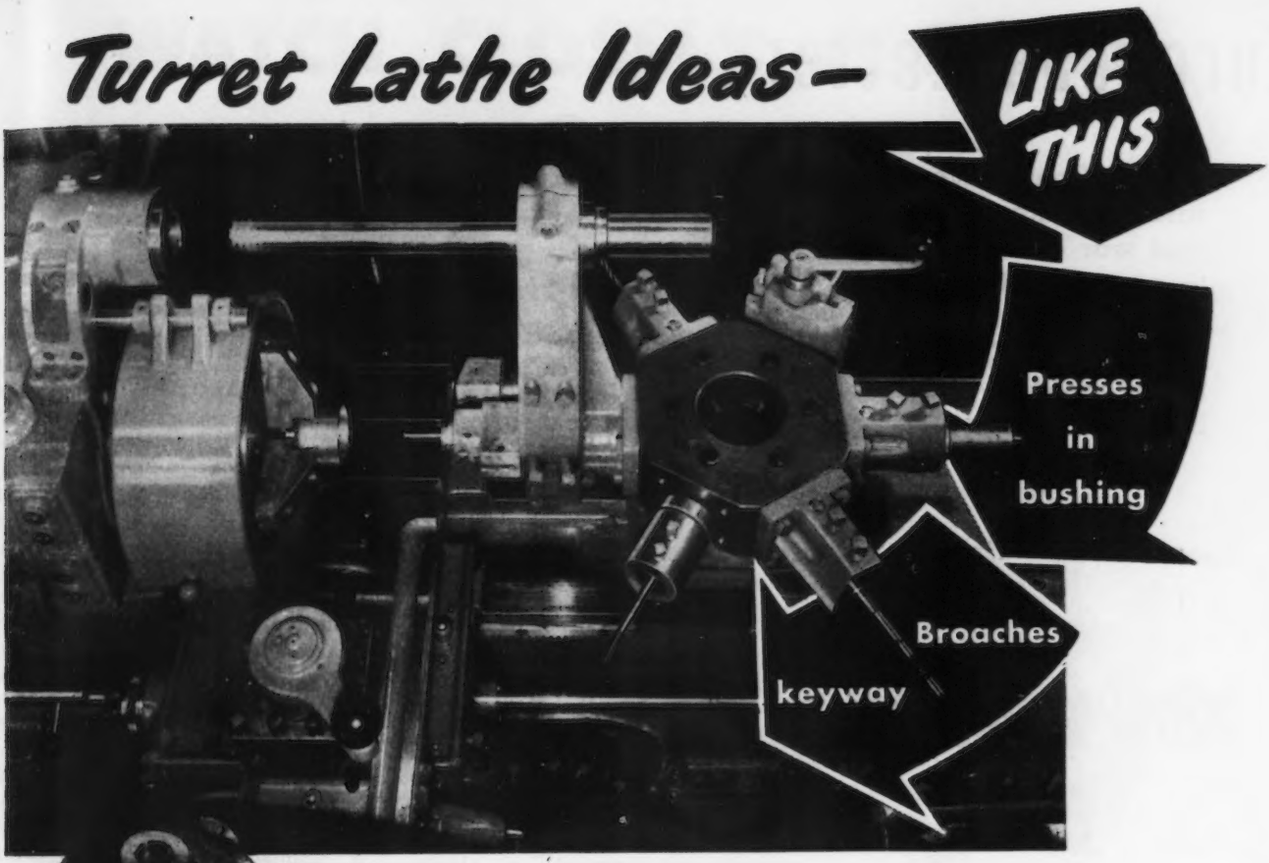
Turret Lathe Ideas—



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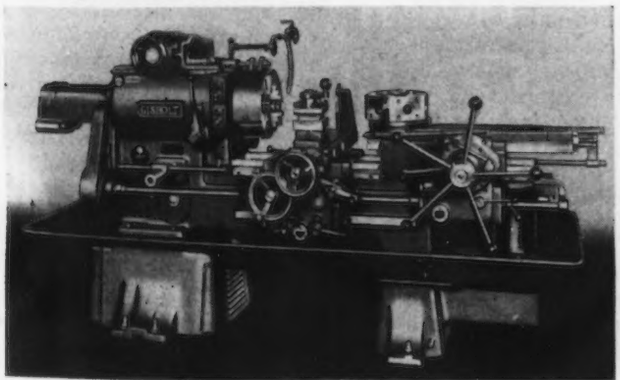
Broach the keyway
Press in a bushing
Finish machine in place

Gisholt No. 3 Universal Ram Type Turret Lathe



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European Letter . . .

• Paris Conference results in change from cold war of movement to one of position . . . Both sides playing waiting game . . . Cracks in Soviet monolith West's best hope.

LONDON—For the first time since the autumn of 1946, the Council of Foreign Ministers has brought one of its sessions to a seemly end. Nobody walked out. No wave of vituperation flooded the press. An agreed communique could be issued, and before the Ministers dispersed they decided upon a procedure to reconvene their Council later in the year. All this is in such marked contrast to the end of previous meetings that it does much to mask the uncertainty evident in the actual terms of the communique. In fact, the Foreign Ministers have not done much more than agree that they would like in principle to agree. Perhaps this marks some advance; but what precisely it means in its concrete application to Germany and Austria has still to be worked out.

The German problem is, in the main, handed back to the occupation authorities in Germany. True, the Russians have made further consultations between the four Governors possible by agreeing not to reimpose the blockade, but this preliminary is all that is decided. The task is now laid upon the High Commissioners in Germany of working out a *modus vivendi* which accepts the division both of the country and of Berlin, but seeks to mitigate its economic consequences. The scope of the proposed conversations will be the expansion of trade and the development of economic and financial relations between the zones, the easing of the movement of persons, goods and information across the zonal frontiers and the consideration of matters of common interest to all four sectors of Berlin. The occupying authorities may call also on German individuals and German organizations to assist them in their discussions.

Clearly, this program depends upon the willingness of the Soviet Union and of the three western partners to tackle the concrete obstacles to disagreement. In Berlin itself the blockade is still in being because the railwaymen in the western sector are still on strike. The immediate test of the Paris agreements will be the readiness of the Russians in Berlin genuinely to reassure the German railway workers in the matter of victimization and to recognize their union.

Closer economic relations between the zones depend upon the fixing of a realistic exchange rate—the value of the Soviet mark has fallen once more—upon finding goods in the eastern zone sufficient to warrant an increase in western exports and incidentally upon the willingness of western Germans officially to recognize the credentials of the Germans who represent the Soviet zone. The truth is that the eastern zone, as such, which no longer includes the bread basket of Pomerania and East Prussia or the industrial centers of Silesia, is not a particularly fruitful trading partner. If the four powers seek a genuine increase in commerce, they would be well advised to attempt wider negotiations to include the Soviet Union and the satellite countries grouped in the "Comecon."

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ON the face of it, the agreements on Austria appear more precise. Some of the old stumbling blocks to an agreed treaty have been removed. The Soviet Union has withdrawn its support for Yugoslav claims to Austrian territory and reparations, and Austria's 1938 frontiers can now be accepted as final. The concessions made to Russia's own claims are, however, considerable. In return for abandoning its demand for all German assets in Austria, the Soviet Union will receive $150 million in convertible currency payable over six years, a right to 60 pct of the oil extracted and 60 pct of the oil prospecting rights in eastern Austria, and all the assets held by the Danube Shipping Company in Bulgaria, Rumania, Hungary and eastern Austria. These apparently precise definitions, however, include a number of undecided points. Neither the scale of oil extraction at present nor the areas concerned have yet been determined. The Russian promise to relinquish to Austria all other German assets and war booty involves agreement on the definition of war booty. The procedure to be followed should Austria and the Soviet Union disagree in their interpretation of the treaty is also unsettled. And Mr. Vyshinsky almost cancelled the agreed communique by calling his colleagues back after they had concluded their last meeting to ask for the inclusion in the communique of a statement that interest and profits from Soviet undertakings in Austria should be payable in convertible currency. As it is, all these difficult undecided points are referred to the Foreign Ministers' deputies with the instruction that they must produce an agreed draft by Sept. 1.

With so much undecided, with so many points referred back to negotiators who will meet with infinitely less authority, is it right to hail the outcome of the Paris Conference as a *détente*, or argue that it in any way represents a new stage in the relations between the great Powers? Its importance should certainly not be exaggerated, but one thing at least it seems to represent —Russian acceptance of the present

(CONTINUED ON PAGE 112)

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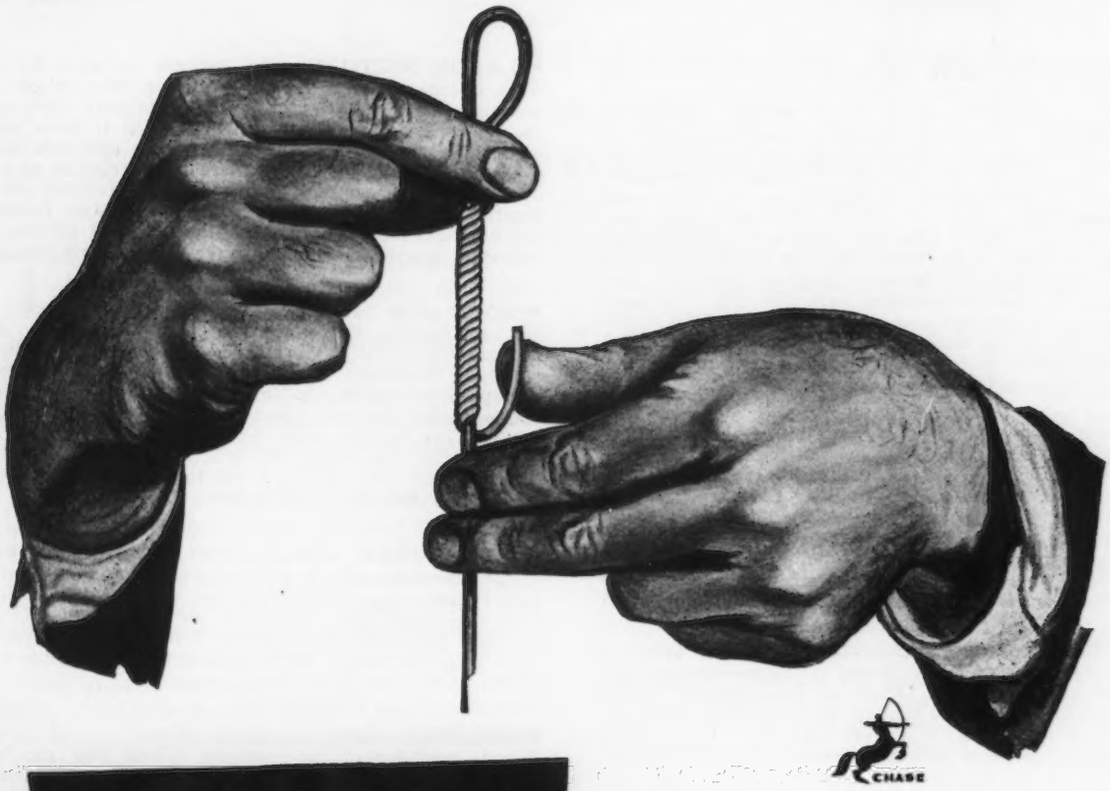

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• **ORE CONSUMPTION**—Consumption of Lake Superior iron ore during May was 7,276,719 gross tons of which 7,014,544 tons was consumed by U. S. furnaces and 262,175 tons by Canadian furnaces, according to Lake Superior Iron Ore Assn. This compares with 7,321,856 tons for April and 6,656,498 tons for May a year ago. Cumulative consumption to June 1 amounted to 35,713,391 tons for U. S. and 1,202,840 tons for Canada, a total of 36,916,231 gross tons compared with 30,548,370 tons for U. S. and 1,215,693 tons for Canada, a total of 31,764,063 tons to the same date a year ago. There were 173 furnaces in blast (164 U. S. and 9 Canadian) on June 1 compared with 184 (175 U. S. and 9 Canadian) a month ago and 178 (169 U. S. and 9 Canadian) a year ago. Idle furnaces June 1 were 21 U. S. and 1 Canadian compared with 10 U. S. and 1 Canadian a month ago and 13 U. S. and 1 Canadian a year ago.

• **LAYOFF**—Eight hundred of the 1100 employees of the Bond Plant of American Radiator & Standard Sanitary Corp., Buffalo, will be laid off indefinitely following their annual vacations which will close down the plant on July 1. P. B. White said that heavy inventories were the reason for the action. About 300 workers will be retained for shipping and maintenance work. One of the plant's two foundries was closed about a month ago. The plant makes boilers for hot water and hot air heating.

• **NO QUOTAS**—Export quota restrictions have been removed from aluminum plate, sheet, and strip for the third and fourth quarters. The Office of International Trade said this action supersedes that of May 13 when OIT announced that third quarter export quota for these products would be 15,000 short tons. Export licenses are still needed.

• **STYMIED**—A large Chicago steelmaker, pressed for increased southbound barge shipments, of steel, last week sent its experts down to St. Louis to look over dock facilities there. They report the municipal dock is in such bad condition it is practically useless. Railroad interests own most of the other good river front properties which might eventually be used.

• **FURNACE OFF**—No. 4 furnace at Edgar Thompson Works of Carnegie-Illinois Steel Corp., in the Pittsburgh district was blown out June 20 due to lack of need for the iron. No. 4 is a 19 ft 3 in. hearth unit with annual rated capacity of 225,000 net tons of iron. It was relined in 1943.

• **LABOR PICTURE**—The outlook on steel labor this week is still not clear cut. If the union were to get a final turndown on a wage increase and no concrete development on pensions things would be tough. But if there were to be an amicable agreement on insurance and sick benefits, that might bar a strike. If there is a strike it may wind up with the government in on the deal—provided the Taft-Hartley Law is still in effect. But with steel orders and the business trend down, a shutdown won't hit too many industrial people—unless the strike were to be a long one.

• **SOLD**—The hand sheet mill of Phoenix-Apollo Steel Co. at Apollo, Pa., was bought last week by M. N. Landay Co., Pittsburgh. Purchase included all equipment, land and buildings. A bid of $125,000 submitted by the townspeople proved too small. Size of the successful bid was not disclosed. The plant will be held intact for 60 days while effort will be made to find someone to operate it. Failing this, the machinery will be dismantled and sold. The Landay Co. will then try to get one or more new tenants for the plant buildings.

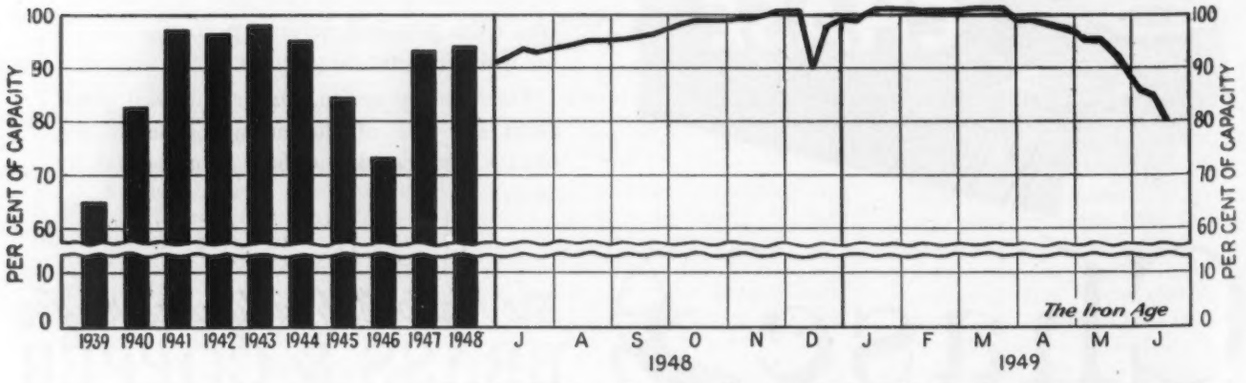
• **LONE STAR LOAN**—The Reconstruction Finance Corp. This week turned down a request by Lone Star Steel Co., Dallas, for a $74,103,000 loan which would have been used to expand that company's war-built plant. RFC said it might lend half that amount if the Texans would raise 59 pct equity capital. RFC said it is not making 100 pct loans.

• **CLOSING**—American Brake Shoe Co. will close the Atlanta foundry of its Southern Wheel Div. on July 31 because of lack of orders. The plant employs 57 people in the manufacture of chilled tread freight car wheels. The company plans to sell the property and equipment. Customers will be served from other plants of the company.

• **PURCHASE**—Threadwell Tap & Die Co., Greenfield, Mass., has purchased the assets, plant and business of Conant & Donelson Co., Conway, Mass. Paul W. Polk, vice-president and manager of Threadwell, said production formerly at Conway has been transferred to Greenfield.

• **PIG IRON REDUCTION**—Mystic Iron Works, Boston, reduced the base price of its pig iron by $2.50 per gross ton last week.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 21	83.0*	96.0	75.5*	88.0	90.0*	88.0*	78.0	103.0	86.5*	84.5	74.5	66.5	89.0	84.5
June 28	82.0	93.0	76.5	82.0	89.0	74.5	78.0	101.0	82.0	85.0	69.0	81.0	62.0	80.0

* Revised.

Industrial News Summary

- ***Steel Industry Faces Summer Dip***
- ***Operating Rate Falls 4.5 Points***
- ***No Signs Yet of Base Price Cuts***

THE steel industry is facing a summer letdown that may be interpreted as something it isn't. Output will drop off and orders will lag. Most of this fresh rash of less activity is due to: (1) Summer seasonal factors; (2) working off of inventories "just in case"; (3) waiting for outcome of labor negotiations and (4) wholesale shutdowns for mass vacations.

This chain of events may dig deep into the operating rate. But it does not mean that things are going to pot in steel. This week it looks as if steel business will be somewhere in between the extreme optimists and the pessimists. The lower level of operations had to come as steel went into a normal pattern.

This year a number of mills will shut down whole departments and there'll be less incentive to pay men to work during their authorized vacation periods. On top of vacation schedules there will be added down-time which will be used to repair equipment. Steel users are also extending vacation periods and with inventories higher than needed in many cases there is no reason to keep on piling up steel stocks.

As to fresh order volume, this week it is off. Cancellations are still heavy and there is no real interest in ordering because of possible steel shutdowns or changes in price. Most steel users are not worried about the possibility of a steel strike. Nor are they worried about higher prices.

STEEL consumers are still yammering about lower steel prices. But there is little chance that they will get these in the near future—except in the case of freight absorption, if that starts soon. If Congress approves the Freight Absorption Bill major steel companies will begin cautiously to absorb freight. When they do, this means lower prices for steel users who have had to pay big freight bills from remote points. Absorbing freight, however, won't be as easy as it looks.

Freight absorption in steel will depend on: (1) What is the freight rate and how much has to be absorbed; (2) if it is too high it may be uneconomical for the steel firms to do it; (3) heavy thinking must be done to comply in such a way that there will be no question of long legal battles trying to prove no collusion, good faith and no injury to competition.

It is well to remember that all steel firms are still in the clutches of a Federal Trade Commission case in which they have been accused of collusion. The final outcome of this case may take a long time. But that does not change the fact that steel consumers may soon be benefiting from steel competition in which freight absorption will play a big part.

No signs of cuts in the base price of steel are apparent this week. It will take a drastic drop in steel operating rates before anyone tries to get a big chunk of business that way. At the same time it is unlikely that anyone in steel will entertain lower prices until the coal and steel contracts have been signed. This week it looks as if there could be trouble in steel labor.

It can be expected that if Mr. Murray gets the brush-off on his entire demands on wages, welfare and pensions a strike is not only a probability, but a strong one. How long it would last and whether it would wind up in federal government machinery remains to be seen. But if Mr. Murray's steelworkers get no wage increase but a good social security package—without pensions—there is only a remote possibility of a strike.

AS things stand now it is a good guess that the steelworkers will not get a wage increase but they have a chance of making hay on their fringe demands. As to pensions it looks as though steel firms will stick to their guns and not give in. That steel must sooner or later entertain negotiations on pensions goes without saying. But they are not ready yet. When they are ready they will plug hard for an employee-employer contributory plan, not an all-out company financed plan.

Steel operations are scheduled this week at 80 pct of rated capacity. This is a decline of 4.5 points from last week's operating level, and the sharpest drop of the year. Part of the dip is due to seasonal factors, for July is normally a poor production month—even during the war July production generally dropped below the June level. Part is due to shutdowns of furnaces for the July Fourth holiday and part can be laid to declining business.

Steelmaking scrap, reacting to buyer indifference and the possibilities of steel labor trouble, slid off sharply again this week. Declines in Pittsburgh, Chicago and Philadelphia sent THE IRON AGE steel scrap composite price down by 92¢ per gross ton to $19.33 a gross ton, a new low for the year. While this is a few cents higher than the OPA price it is actually several dollars a ton lower because certain freight charges were allowable under OPA regulations. As machine shop turnings generated in industrial plants slipped to $3.50 a ton in New England it became apparent that at the present rate some steel fabricators can soon expect nothing at all for this grade.

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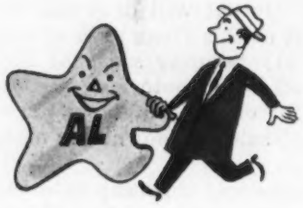
is a lifetime 

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Mills Would Absorb Freight In Many Cases and Study Others Carefully

o o o

By D. I. BROWN
Chicago Regional Editor

o o o

Chicago

• • • **For the second time** in a year the steel industry's marketing methods and selling prices may be severely jolted. The O'Mahoney Bill changes black to white but the industry isn't kidding itself. Technically, much of the legal underbrush can be momentarily cleared out of the black forest, but if anybody thinks this would be a return to basing point selling he is mistaken.

The steel industry didn't directly sponsor the bill, although they did want clarification of freight absorption. The marketing of beet sugar and that of steel sheets is not too similar. Even sales executives who rooted for something like the O'Mahoney Bill admit freight absorption, the way it would be practiced if not handled carefully could backfire and do immeasurable harm to this basic industry.

Three top steel sales executives here told this reporter last week that the new bill presents complications and will not be a panacea. In the process of changing black to white, the industry is going to encounter more shades of gray than there are price extras in all the steel products manuals combined.

Mill officials told THE IRON AGE they will immediately start to absorb freight into large consuming centers where they are more or less certain they must absorb in order to be competitive, when the bill is passed. In fringe cases it will require long study of each case before coming to a final decision. Either way their decision will be made on a single product basis, taking into account all producing centers item by item, as each production spot is now a base point. Further, after doing this they will have to check freight rates to determine how much absorption they must swallow.

Some mills expect that in competitive areas they may have to supplant their regular salesmen with freight rate experts, or train the salesmen in using the freight rate book. Since salesmen last used freight rate books, the additional supplemental tariffs have become extremely more complicated. Steel traffic men told IRON AGE that experience proved that few salesmen could adequately handle such details. This fact, they expect, will be troublesome particularly when a customer wants a quick, on the spot answer, and more particularly when he wants a type of movement on which there are no published rates.

Consider a typical example of an area which might be considered competitive. A consumer in Muncie, Ind., who decides to buy 4 in. carbon bars gets a delivered price quotation from a mill. The salesman from another mill calls and also wants the order. The buyer asks the new salesman "What is your price?" What can the salesman say? He will have to counter by asking the buyer, "What's the best price you have?" If this salesman's mill is to intelligently meet competition the salesman will have to find out somehow, the freight charges. He will have to find out also if it is truck or rail from Chicago, all rail or truck from Youngstown, or combination water and truck from Lackawanna, truck or rail from Cleveland or combination barge and truck from Pittsburgh.

Perhaps the mill that submitted the first quotation, now in the buyers hands, only makes up to 4 in. bars. The customer also uses up to 6 in. carbon bars. Before the salesman can quote, he had better know the bar size of the order in ques-

Wanta Try It?

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Congress Moving On Freight Absorption

Washington

• • • Congress moved this week to give its final approval to legislation authorizing freight absorption.

But opposition to such approval was reaffirmed by Representative Patman, D., Texas. A parade of hand-picked witnesses testified on June 28 before Patman's House Small Business Committee against enactment of any bill allowing producers to pay freight charges.

The bill has already passed the Senate and now awaits debate and final vote in the lower chamber. Representative Walter, D., Pa., sponsor of the O'Mahoney measure in the House, is attempting to steer the bill toward final vote within the next week to 10 days.

The bill is in substantially the form in which it was introduced in the upper chamber.

tion as he otherwise might inadvertently agree to absorb freight on a bar size in which he has a natural advantage as the other possible competitors don't make big rounds. To go the next step, what does he do if the buyer won't or can't tell him these things?

If that sounds complicated, consider the Chicago mill which historically has always accepted carbon bar tonnages at a loss, delivered into parts of Michigan, only because the same large consumer has been kind enough to give the Chicago mill part of the profitable alloy bar business shipped to other divisions of the big customers' scattered plants, some located in Michigan and some in close-by Indiana.

Steel sales executives admit that now once again they must sit down with each and every customer and work out a deal whereby the steel company can come out ahead on the overall basis. There will be restrictions in products, limitations in size, limitations on how much the producer can ship and how much the consumer can receive in three types of transportation methods. All of these facts, tempered with freight rates of each and every type of movement add up to an atmosphere of a three ring circus plus a midget auto race and a bargain basement sale combined.

A year ago the sanction to absorb freight would have been easier, steel experts here declare. By now the mills would have worked out a sound pattern of freight absorption.

Mill quotations will have to be changed many times under freight absorption, as a mill might spend a week working out a good deal with a worth while account only to find they must scrap it the next day because the competition figured out a new angle. Salesmen have always had to see a price before their legal department would permit their meeting it. Some salesmen now believe they will have to secure photostats in many cases.

One thing is certain. Future prosecutions by FTC for what might pop up as a possible violation may be very difficult. Why? Because no individual will be able to accurately tell a court, or his own mother, who did what and with which and to whom. If by some occult method the first three facts could be proved, who this side of heaven is going to determine why it was done? To rule on the "good faith" clause of the new bill the court would have to know why.

Senator O'Mahoney Stresses Importance Of Clarifying Price Policy

Chicago

• • • **Senator O'Mahoney** addressing a luncheon session of the Chicago Assn. of Commerce & Industry, last week, declared that if competition disappears as a result of monopolistic business practice or government control we will have lost our basic system of unlimited opportunity found in free enterprise policies. The Wyoming senator, who in TNEC days asked Congress to pass an f.o.b. mill price law told the asembled businessmen that failure of the Supreme Court of the land to clarify pricing policy made it mandatory that Congress straighten things out.

Senator O'Mahoney

He said his first objective in sponsoring the freight absorption bill now before the House, and already passed by the Senate, was to abolish the uncertainty between government regulations and business. The second objective, the senator said, was to provide a plain statute that could not be misunderstood regarding delivered prices and freight absorption so as to permit business to again be competitive without fear of prosecution by the FTC or other government agencies.

He outlined the proviso which he feels protects the second objective and which does preserve the fundamental concept of anti-trust laws. He told the group that immediate action on the law was mandatory as the lack of action would promote further uncertainty in business and thus bring about more unemployment.

The senator declared that the O'Mahoney bill now in the Rules Committee of the House cannot be pigeon-holed and will come up for early consideration. He said that the Small Businessmen's Committee of the Senate, which recently has divulged they would like to hold hearings on the bill before it is finally passed, will do more harm than good because such hearings would only postpone the eventual enactment of the law, "The longer action is delayed the worse it will be for small businessmen," the senator declared.

The senator flatly stated that the passage of the O'Mahoney bill would clarify all the confusion wrought by court decision in the last few years. He said he was against the moratorium bill proposed sometime ago in congress because in itself it would only prolong the confusion.

The senator, however, emphasized no matter how good the bill is, it will not ultimately be successful unless business leaders and the government can agree.

George T. Hook

Tom C. Campbell

W. A. Phair

G. F. Sullivan

W. V. Packard

• • • George T. Hook was appointed publisher of THE IRON AGE last week, succeeding T. L. Kane who resigned. At the same time Tom C. Campbell was named editor. He succeeds T. W. Lippert who also resigned. Other appointments included W. A. Phair, managing editor; George F. Sullivan, markets editor and W. V. Packard, news editor.

Mr. Hook has been with Chilton Co., Inc., for more than 25 years, serving in various editorial capacities of that company's automotive publications. For the last 15 years he has been the chief editor of Commercial Car Journal. He is also a director of the company.

Tom Campbell has been engaged in IRON AGE editorial activities since 1936, when he became regional editor at Pittsburgh. Since coming to New York in 1944, he has served as news and markets editor.

Bill Phair has been with THE IRON AGE 12 years. His latest post was that of technical editor. Before joining the staff he was with the foundry division of Thatcher Furnace Co. George Sullivan comes to New York from Pittsburgh, where he was regional editor. He joined THE IRON AGE in 1942, after service with The Baldwin Locomotive Works in various capacities. Bill Packard came to THE IRON AGE in 1946. Prior to that time he was in the newspaper business in Missouri.

Steel Workers Begin Bargaining Sessions With Inland Steel

Chicago

• • • **Results of the first** bargaining sessions with Inland Steel and the unions representing the workers of the company's plants which were held recently, terminated with nothing concrete decided. United Steel Workers of America, CIO, in behalf of Local 1010 and Local 64, made the following demands:

(1) All persons who have been retired since Dec. 31, 1945, who had reached the age of 65, be reinstated with full back pay.

(2) A pension plan shall be instituted with all members of the bargaining unit covered, and retirement to be at the time chosen by the employee, without compulsion, direct or indirect from management, beginning at age 65. They went further with retirement by asking that the retirement plan cover employees permanently incapacitated for work, upon completion of a total of 10 years' service with the company; a pension payable upon retirement of $150 a month, excluding any insurance benefit of the Social Security Act; financial support to be provided exclusively by Inland Steel; the existing retirement plan of the company to be terminated insofar as contributions by employees are concerned.

On insurance the union also asked that all members be covered; a benefit equal to pay for 3120 hr to be paid to the beneficiary of a member dying while in active service; a benefit of not less than $1500 (but not less than the amount provided by the present insurance plan) to be paid to the beneficiary of an employee dying after retirement for age or disability; plus certain cash benefits, hospitalization service, etc.

Inland Steel is one of the few large companies who have already put into effect a pension retirement plan plus insurance and health benefits. The insurance program was inaugurated by the company in 1930 and the pension plan in 1936. Company officials have estimated that the past cost of such services to the company has already exceeded $10 million. To date Inland has paid more than $4¼ million for the past service pension trust now in effect.

It appears that the biggest issue and one that is basic to all these fringe claims, is the fact that the union does not want compulsory retirement at age 65. This argument will almost have to be settled before any of the others can be intelligently tackled. Independent observers here believe the union may well settle for a simple adoption of the present benefit insurance and pension plan in effect by the company by having them written into the contract. Although this would not benefit the local union it would give tremendous emphasis to the union's national effort to secure such fringe benefits.

The union has promised in the next scheduled bargaining meeting to have Murray Latimer, their consultant, present so that they can get down to brass tacks on the fringe issues. They have also promised at that time to make known to Inland what wage increase they will demand.

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Industrial Briefs . . .

• LITTLE UN—A miniature United Nations Assembly meets every day in the Willys-Overland Motors service school in Toledo with delegates from India, Norway and San Salvador to study manufacturing and servicing methods.

• OPERATIONS OVER—The Superior Sheet Steel Div. of Borg-Warner Corp., Canton, Ohio, has announced that after having served its purpose of supplying other plants of the parent corporation with more than 100,000 tons of steel during the shortages of the last 2 years, it will discontinue operations indefinitely after June 30.

• BRAZILIAN GUEST—Dr. Robert F. Mehl, director of the Metals Research Laboratory and head of the Metallurgical Engineering Dept. at Carnegie Institute of Technology, Pittsburgh, will fly to Brazil this month to be a guest at the fiftieth anniversary of the Research Institute of the State of Sao Paulo.

• TRANSFER—Worthington Pump & Machinery Corp., Harrison, N. J., has announced the expansion of the Water Treating Equipment Sales Div. and the transfer of that division to the corporation's Dunellen Works at Dunellen, N. J.

• BRANCHING OUT—The Hartford Special Machinery Co., Hartford, has announced the purchase of the special drilling machinery line formerly manufactured by the Langelier Mfg. Co. of Cranston, R. I. It has also bought the rights to manufacture an automatic thread roller machine and a die polishing machine.

• DUST CONTROL REP—American Air Filter Co., Inc., Louisville, has announced the appointment of Industrial Sales & Engineering Co. operated by C. W. Dean as dust control representative for the Memphis and vicinity territory.

• NEW MONIKER—The American Institute of Bolt, Nut & Rivet Manufacturers has changed its name to the Industrial Fasteners Institute. The name change in no way affects the present organization.

• SAFETY FIRST—Another American Steel & Wire Co. plant has been honored recently by the National Safety Council when the Worcester Works received a plaque for distinguished service in recognition of operating over 3 million man-hr without a disabling accident.

• NEW NAME, NEW WORKS—The Indus Tool & Mfg. Corp., Indianapolis, has announced a change in their firm name to the Indus Corp. They have also opened an assembly plant at Greencastle, Ind., which will handle the fabrication and assembly of metal products, particularly stampings and welded items.

• GROWING—C. A. Norgren Co., pneumatic products manufacturer, has announced the purchase of a 3½ acre tract of land in Englewood, Colo., a Denver suburb, as the proposed site of a new plant.

• NEW GUILD STAFF—The Electric Metal Makers Guild, Inc., has announced the election of the following officers: president, F. O. Lemmon, Ohio Steel Foundry Co., Springfield, Ohio; vice-president, E. J. Chelius, Carnegie-Illinois Steel Co., Duquesne, Pa.; secretary-treasurer, R. J. McCurdy, Republic Steel Corp., South Chicago, Ill.

• GARY SALES—Opening of a sales office at 504 Broadway, Gary, has been announced by Cutler-Hammer, Inc., electrical manufacturers.

• TOOL AGENT—Pye-Barker Supply Co., 231 Pryor St., S. W., Atlanta, has been appointed a distributer for Carboloy Co., Inc., Detroit tool manufacturers.

Purchasing Men Discuss Present Day Problems

Chicago

• • • **The National Assn.** of Purchasing Agents held its 34th annual convention at the Stevens Hotel recently. Buyers of practically all important firms in many diversified fields concentrated their discussion on present day purchasing problems, price and business trends.

The fact that the nation's buyers are back in the drivers seat was evident everywhere. Discussions in the cloak rooms and hotel lobbies centered mainly on "where do we go from here?"

All the meetings and major addresses were well attended and among the notable speakers in the field of metals were Charles R. Cox, president of Carnegie-Illinois Steel Corp.; William C. Johnson, executive vice-president, Allis-Chalmers Mfg. Co.; Whipple Jacobs, president, Phelps Dodge Copper Products Corp.; Carl A. Ilginfritz, vice-president, U. S. Steel Corp.; Fred G. Syburg, purchasing agent, Chain Belt Co,, and Harry L. Erlicher, vice-president, General Electric Co.

Forum discussions on many commodities in many industrial fields were featured at the convention. Another well attended feature at the convention was the Informa-Show at which 100 industrial suppliers exhibited their products.

Form Soil Pipe Institute

New York

• • • **J. J. Nolan, Jr.,** vice-president, Central Foundry Co., has been elected president of the newly formed Institute of Cast Iron Soil Pipe and Fittings Manufacturers. The new institute includes about 26 of the 35 manufacturers of soil pipe and fittings.

Other officers selected were: Robert Dick, executive secretary; George L. Harberger, Eastern Foundry Co., vice-president; and Deems W. Hallman, Hajoca Corp., treasurer.

Members of the executive committee are: J. J. Nolan, Jr.; Charles A. Hamilton, Alabama Pipe Co.; and William Deyo, Anniston Foundry Co.

Steel Companies Unwilling To Start A Price War At This Time

Few Overlook Possibility That One May Come If Ingot Rate Falls Sharply

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By GEORGE F. SULLIVAN
Markets Editor

o o o

Pittsburgh

• • • **No steel company** is willing to reduce base prices now but cuts may come before the year is out. Undoubtedly no one is even planning major price reductions at this time. What may actually happen within the next few months is another story.

Charles R. Cox, president of Carnegie-Illinois Steel Corp., last week said he saw no steel price cuts due. Frank Purnell, head of Youngstown Sheet & Tube Co. said the same thing. E. T. Weir of National Steel Corp. wrote recently that he saw no reason why steel should be produced at a loss. Yet price cutting often leads to production at a loss.

There is no question of the sincerity of the statements of these steel leaders but they are not making blanket predictions covering the rest of the year. They can't for two reasons: (1) they can't read the minds of their competitors; (2) in their own cases they can't predict industry conditions a few months hence.

Benjamin F. Fairless, in a talk given at Pittsburgh in May summed up the possibilities: "Another present fact is a relaxation in the demand for steel. If this becomes more pronounced the economies made possible by high volume may disappear and costs may rise. At the same time competitive pressure may drive down prices."

In the minds of steel men the price question has several angles. Can they afford price cuts and are they necessary? At the present operating rate of the big companies price reductions are not necessary. But if operating rates continue to fall, some important steelmaker may some day step out with a quiet cut and book some business. It is the law of supply and demand.

Purchasing agents look for lower prices because scrap and fuel costs are lower. Heavy melting steel scrap now costs about $20 a ton less than it averaged last year. The steel industry as a whole charges about a fourth of a ton of purchased scrap for each ton of ingots poured. A $20 ton reduction in scrap prices equals about $5 per ton of ingots, or approximately $4 per ton of finished steel.

The decline in fuel oil prices means that finished steel can be produced today for about $1 a ton less than it could last year.

Scrap cost is misleading because some companies use much less purchased scrap than the industry average. U. S. Steel uses only about a tenth purchased scrap in its furnaces; Jones & Laughlin is believed to use even less. Some smaller companies use anywhere from 50 to 100 pct of purchased scrap in their furnace charges. It is the bigger companies that take the lead in changing steel prices.

Offsetting these decreases the steel companies this year are paying $1 a ton more for ore than they did in 1948. This amounts to approximately $1.65 per ton of finished steel. Freight rates on the raw materials moved into steel mills were boosted 10 pct in May 1948 and another 5 pct in January 1949. It takes almost 5 tons of raw materials per ton of finished steel.

Despite these and other cost increases, such as that on manganese ore, the net effect on costs so far has been a reduction. At near-capacity operations this cost saving would be substantial. But as operations fall toward the break-even point the effect of lower raw materials costs begins to be eaten up by overhead charges and inflexible wage rates. Where the two meet is unknown.

On top of this uncertainty is the obvious one: Labor. Until steel companies know how much, if any, more they will have to pay miners and steelworkers they will not know what their costs will be a month from now.

Therefore there is no justification—in steel men's minds—for any major base price cut at all at this time. Such a reduction could be intelligently planned if costs were known and the market outlook was clear. At present many of the larger steel companies are still operating marginal, or high cost, facilities—particularly open-hearths and blast furnaces.

The outlook then is not promising for the steel buyer looking for a quick price cut. One could come soon but the odds are against it. The time to look for one is when all marginal facilities have been shut down and the operating rate of the big companies—whose price action forces others to meet their competition—falls further.

Even when this happens the steel people who were once inclined to sharply slash prices to get business will think twice before they do so. For their action will be spotted fast and their price met. They know more about costs today than they ever did—thanks to OPA—and what once looked like a good bet may now show up as a bad gamble.

UNIVERSITY PRESENTATION: *Diecasting machine presented by Doehler-Jarvis Corp. to Rensselaer Polytechnic Institute. Standing behind the cold-chamber diecasting machine are, left to right: Professor G. K. Palsgrove; F. J. Koegler, executive vice-president of Doehler-Jarvis, and three Rensselaer officials; L. W. Houston, president; M. A. Hunter, dean, and N. P. Bailey.*

ICC Plans Conference To Eliminate Dangerous Practices In Shipping of Steel

Washington

• • • **The Bureau** of Motor Carriers, Interstate Commerce Commission has set July 7 at the date for an informal conference with steel manufacturers, motor carriers engaged in the transportation of steel, and manufacturers of motor vehicles. Purpose of the meeting is to explore means of eliminating dangerous practices that have arisen due to the increased movement of steel by trucks, resulting from the switch to f.o.b. mill selling and rapidly advancing rail freight rates.

The problem arose originally out of observation by members of the staff of the Bureau of Motor Carriers, as well as by state authorities, of unsafe practices in the transportation of steel by motor vehicle. It was found that gross weight limitations were being violated in exaggerated degree to such an extent that it was manifestly apparent that these vehicles could not safely operate as loaded. Accidents involving this method of transportation were found to be increasing out of proportion to the extensiveness of this traffic and remedial measures were indicated, according to the BMC.

The commission hopes that corrective measures may be arrived through cooperation of all parties concerned. In its letter to the conferees the commission stated: "Whether or not, in order to correct the situation * * *, it will be necessary to establish regulations for the governance of the practices complained of, remains to be established. If correction could be made by cooperative means, this would be desirable. The discussions in this conference will doubtless have a bearing upon the decisions made in this connection."

The BMC has also drawn up a list of practices, which would go a long way toward eliminating the problem. These suggestions are in no way firm proposals and do not mean that regulation is necessarily contemplated, but are merely for purposes of discussion at the meeting. They relate to cooperative action to be taken by motor carriers and shippers to prevent loading of unsafe vehicles and to prevent overloading and action to be taken to assure adequate securing of loads. The conference will also discuss the formation of a loading rules committee between shippers and carriers, or, alternatively, establishment of Commission regulation. The suggested rules would apply only to basic fabricated steel products.

Representatives of the following firms and organizations have been invited to attend the meeting:

Steel Companies: Republic Steel Corp.; Bethlehem Steel Co.; Armco Steel Corp.; Youngstown Sheet & Tube Co.; Jones & Laughlin Steel Corp.; Carnegie-Illinois Steel Corp.; Joseph T. Ryerson & Son, Inc.; U. S. Steel Corp.

Motor Carriers: Alger Trucking, Detroit; American Transit Lines, Chicago; Bigley Bros., Hoboken, N. J.; Brada Cartage Co., Inc., Detroit; Service Transport Co., Cleveland; Davidson Transfer & Storage Co., Baltimore; Wheeling-Steubenville Truck Service, Inc., Wheeling, W. Va.; Michigan Motor Freight Lines, Inc., Detroit; Steel Transportation Co., Inc., East Chicago, Ind.; Reinhardt Transfer Co., Portsmouth, Ohio; Cushman Motor Delivery Co., Chicago; Glen Cartage Co., Girard, Ohio; Wenham Transportation, Inc., Cleveland.

Associations: Assn. of Highway Steel Transporters; Truck Trailer Manufacturers Assn.; and Motor Truck Div., Automobile Manufacturers Assn.

For this first informal meeting, the above list of conferees was drawn entirely from the area east of the Mississippi River, due to the fact that practically all of this traffic is concentrated in this area.

NEW OFFICERS: *Officers of Amertool Services, Inc., a corporation of 11 prominent American machine tool manufacturers who have become associated to promote the sale of machine tools in Latin American countries. Left to right: S. A. Brandenburg, first vice-president; R. M. Lippard, treasurer; N. F. Caldwell, president; D. R. Weedon, secretary, and J. C. Hebert, second vice-president.*

Receives Boeing Contract

Dallas

• • • **Texas Engineering & Mfg. Co.** recently received a contract from Boeing Airplane Co. to design and manufacture 67 separate production tooling items for the Boeing B-47 six-jet bomber.

Robert McCulloch, TEMCO president, also revealed that there was a possibility the initial award could be increased to as high as 200 items. Included are welding jigs, drill jigs, templates, lathe fixtures, mill fixtures, and mill cutters.

Shipyard Offered for Lease

Boston

• • • **First Naval Headquarters** announced recently that the Naval Industrial Reserve Shipyard at Hingham, Mass., formerly known as Bethlehem-Hingham Shipyard will soon be formally offered for lease to commercial interests. The plant comprises 110 acres. Buildings, shipways, piers, cranes and other equipment are permanently installed in the area.

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Control of Plant Smoke and Waste Creating Big Cost Problem

Cleveland

• • • **The broadening drive** against smoke nuisance and stream pollution by industrial plants is creating a real problem in the financing of new plants. Management is convinced that the state governments in heavy industrialized areas mean business in strengthening and enforcing measures to reduce these problems. When new plants are in the design stage, management is now studying carefully the problems of waste disposal and smoke abatement and the costs represented by proper controls.

These costs are very significant in the case of the steel industry and represent major increases in plant construction costs. In steel plant construction the waste disposal problem is very acute because of the tremendous volume of water that must be disposed of.

A recent event that focused the attention of the steel industry on the dual problem was the death of some people with respiratory ailments at Donora, Pa., where the zinc producing plant of American Steel & Wire Co. is located. While it is still a debatable issue whether the smoke from the plant was a factor in the loss of life, the industry is in no position to jeopardize its public relations to the extent of permitting such a charge possible. So leaders of the industry are taking every precaution in new plant construction to control smoke and waste disposal beyond the needs of present control laws.

Plant construction engineers say that there is no rule of thumb to determine the cost of control measures. They vary industry by industry and from plant to plant in the same industry. In many cases the control measures are very costly, depending on the type of waste and how much it must be diluted. Construction engineers report that in many industries there is considerable opposition on the part of management to make the expenditures required by existing regulations to establish controls in existing plants and even in new plants.

Technical Advances Revealed In Control Features of Some Manufacturers

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By JOHN ANTHONY

Eastern Regional Editor

o o o

The state laws often provide any number of loopholes which permit delaying tactics to be used. State governments generally are engaged in tightening up their laws on this matter, and the future may bring much more effective enforcement regulations than at present. The whole program is a long range one, however, and the viewpoint of the enforcement authorities is that gradual progress is being made.

There is also the problem of the need for more effective Federal Government regulation. This is sure to come in time, for the stream pollution abatement activities of any state can be made completely ineffectual by weak control measures of an adjoining state or its municipalities.

The 23rd annual meeting of the Ohio Sewage and Industrial Wastes Treatment Conference met here last week. At this meeting information was made public on major technical advances in the control of pollution.

The Dow Chemical Co., which has spent $3 million on research into the problems of waste disposal, reported a successful biological treatment of phenol laden water, one of the most difficult problems in pollution abatement. Colonies of harmless bacteria have been found to clean out 99.8 pct of the phenol content of polluted water. The process was discussed by Thomas J. Powers, project engineer on waste disposal for Dow Chemical Co.

Standard Oil Co. of Ohio here has developed a method of extracting waste oil from water that has proved more than 99 pct efficient, according to Donald G. Stevens, engineer.

Louis B. Perillo, Jr., another member of the oil company's engineering staff, explained operations of the local recovery plant and a new $1 million facility recently completed in Toledo for the same purpose.

Each day some 5000 gal of waste oil are purged from Lake Erie's waters by the Toledo facility. Formerly worthless, these

Coming Events

July 11-16	**Concrete Reinforcing Steel Institute,** annual meeting, White Sulphur Springs, W. Va.
July 17-19	**Institute of Scrap Iron & Steel,** midyear meeting, Atlantic City, N. J.
July 20-22	**Pressed Metal Institute,** annual convention, Cleveland.
Sept. 14-16	**Porcelain Enamel Institute,** annual forum, Columbus, Ohio.
Sept. 25-Oct. 1	**American Institute of Mining & Metallurgical Engineers,** midyear meeting, Columbus, Ohio.
Sept. 26-28	**National Electronics Conference,** Chicago.
Oct. 3- 5	**American Coke & Coal Chemicals Institute,** annual meeting, Skytop, Pa.
Oct. 4- 6	**Industrial Packaging & Materials Handling Exposition,** annual convention, Detroit.
Oct. 10-14	**American Society for Testing Materials,** West Coast meeting, San Francisco.
Oct. 12-15	**Electrochemical Society,** semiannual meeting, Chicago.
Oct. 13-15	**Foundry Equipment Manufacturers Assn.,** annual meeting, White Sulphur Springs, W. Va.
Oct. 17-21	**National Metal Congress,** Cleveland.
Oct. 24-26	**American Gear Manufacturers Assn.,** annual meeting, Chicago.
Oct. 26-28	**National Metal Trades Assn.,** annual convention, Chicago.
Oct. 27-28	**Gray Iron Founders Society,** annual meeting, Chicago.

wastes are now sold to the paper industry.

Progress in the neutralization of acids discharged in foundry operations was described by Richard D. Hoak, Pittsburgh, senior fellow at Mellon Institute, and Roy F. Lab of Warren, Ohio, chief chemist for Copperweld Steel Co.

Nonconformers in the stream pollution fight will soon be brought into line by a bill that becomes Ohio law on Aug. 25, according to Fred H. Waring, chairman, Ohio Health Department's Engineering Div. It provides for state approval of industrial and municipal treatment plants. The attorney general will be empowered to sue offenders who refuse compliance. Conviction will mean a $500 fine and $500 for each month's delay in complying.

Mr. Waring described plans in 79 communities for treatment plants valued at $36 million. Five are now under construction, he said, but lack of money is a stumbling block in the path of others.

ECA Engages Adviser To Investigate Greek Steel Requirements

Washington

• • • **R. J. Wysor** of Charlotte, N. C., a former Republic Steel Corp. president, has been engaged by the Economic Cooperation Administration to act in an advisory capacity concerning Greek steel requirements and resources.

Greece's program for constructing an integrated steel plant to bring steel production above the 100,000-ton mark may depend largely upon Mr. Wysor's recommendations.

Under present ECA estimates, the Greek goal could be reached by investing $21 million in an 80,000-ton steel plant to supplement present production of 25,000 tons. The plant would be based on one 400-ton blast furnace, a battery of coke ovens, and three section mills for rolling, the latter to be obtained from Italy in reparations.

Estimated cost of the new capacity is relatively low, about $260 per ton of annual capacity, due to obtaining the rolling mills as reparations. However, the ECA is not yet certain that a plant of this size could be operated in Greece on a competitive basis without a heavy tariff protection. Mr. Wysor is to confer with ECA officials here and in Paris before going to Athens for a first-hand look at the situation before attempting to review the government estimates and plans.

Army Awards Contracts Totaling $60 Million

Washington

• • • **A contract** to supply the government with five crane shovels and parts for a total of $499,600 was awarded to the Harnischfeger Corp. of Milwaukee by the Army Dept.

At the same time, 94 bulldozers and parts were ordered from Gar Wood Industries of Wayne, Mich., for a contract price of $277,012.

Numerous other contracts of $100,000 or more were reported last week by the Army, including a total of nearly $60 million for motor vehicles and parts.

However, less than half of the latter were for Army use, the remainder being for other military services and agencies, including aid for Greece and Turkey. Motor vehicle and parts contracts were:

Highway Trailer Co., 90 2½-ton trucks, $409,432.

Chrysler Corp., 2428 ¾-ton trucks and spare parts, $14,243,501.

Willys-Overland Motors, two contracts for a total of 4573 ¼-ton trucks, $12,464,013.

Reo Motors, two contracts for 4950 2½-ton trucks, tooling and parts, $31,768,013.

Continental Motors Corp., 10 engines, $217,850.

International Harvester Co., 84 5-ton trucks and parts, $364,278.

General Motors, 4 5-ton carriers, $1,325,533.

Receives Navy Award

Boston

• • • **John J. Belton** of Wilmington, an electrician at the Boston Navy Yard has been awarded $575 for an idea which saves the Navy $10,000 in repairing bulkheads on destroyers. He developed a built-up sectional bulkhead for repair of destroyers. Widespread use of the idea in other shipyards is expected to bring a total saving of $700,000.

Barge Order Completed

Pittsburgh

• • • **The last** of a fleet of six 175-ft welded steel hopper barges constructed here by Dravo Corp. for the Ohio River Co., Cincinnati, has just been launched at Dravo's Neville Island shipyard here. The fleet will be used to transport coal in the Huntington, W. Va.—Cincinnati area.

AMERICAN IRON AND STEEL INSTITUTE
350 Fifth Avenue, New York 1, N. Y.

Blast Furnace Capacity and Production—Net Tons

May - 1949 (Month)

	Number of companies	Annual blast furnace capacity	Production: Pig Iron — Current month	Pig Iron — Year to date	Ferro manganese and spiegel — Current Month	Ferro manganese and spiegel — Year to date	Total — Current month	Total — Year to date	Percent of capacity — Current month	Percent of capacity — Year to date
Distribution by Districts:										
Eastern	12	13,353,580	1,078,745	5,323,590	29,399	x 149,113	1,108,144	x 5,472,703	97.7	99.0
Pittsburgh-Youngstown	17	26,625,920	2,067,625	10,476,273	27,611	107,415	2,095,236	10,583,688	92.6	96.0
Cleveland-Detroit	6	6,984,600	523,796	2,821,998	-	-	523,796	2,821,998	88.3	97.6
Chicago	7	15,655,390	1,156,367	5,757,955	4,280	4,280	1,160,647	5,762,235	87.3	88.9
Southern	9	5,010,060	427,004	2,059,367	7,254	35,131	434,258	2,094,498	102.0	101.0
Western	4	2,912,300	194,525	1,087,651	-	-	194,525	1,087,651	78.6	90.2
Total	37	70,541,850	5,448,062	27,526,834	68,544	x 295,939	5,516,606	x 27,822,773	92.0	95.3

x Revised.

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Machine Tool Inquiries In Greatest Volume Since the War

New York

• • • **A light shower** of optimism fell on the order-thirsting machine tool industry last week. The order-thirst is far from quenched. But it doesn't appear to be getting worse. This is good news to machine tool builders, especially in view of the long downward trend they have been experiencing.

It was the dominant note expressed at a regional meeting of the National Machine Tool Builders' Assn. here. The meeting was presided over by L. D. McDonald, president of the association and vice-president of Warner & Swasey Co., Cleveland.

The optimism is centered on two main points: (1) The past few weeks have seen a sharp increase in inquiries and (2) In spite of some hesitancy now being encountered, machine tool people expect to turn many of these into orders as soon as present uncertainties over labor contracts, steel prices and government policy have been clarified. Machine tool builders hope and believe this will happen by early fall.

Few, if any, in the industry are expecting a boom—or anything like it. But the fact that the outlook for orders is no worse—might even improve—in one of the first industries to feel conversion miseries could prove to be good tonic for other industries.

Mr. McDonald sized up the present status of machine tool business like this: (1) After a long downward trend, the industry has apparently leveled off. Production is holding steady at about 10 pct below the 1948 average. (2) Orders so far this year are substantially above the last quarter of 1948.

"Shipments in the first quarter of this year naturally reflected the low volume of orders received during the fourth quarter of last year. But with the turn of the year orders began to increase. First quarter orders showed an increase of 12 pct over the last quarter of 1948. In fact orders for March of this year totaled $27,650,000, compared with $19,950,000 in October of 1948, lowest month of that year."

He added that even though orders were off again in April it is probable that they will average higher for the first half of 1949 than for the last quarter of 1948. This is in the face of a decline in general volume of industrial activity, as indicated by the Federal Reserve Industrial Production Index, which declined from 199 for last October to 177 for April of this year.

Association President Says Depreciation Policy Is Throttling Sales

o o o

By BILL PACKARD
News Editor

o o o

Mr. McDonald believes that periods of business decline are a good time for retooling. He cited several instances in the past when firms had achieved excellent results with this policy.

He listed three reasons why manufacturing costs must be reduced immediately. They are: (1) Prices of manufactured goods are declining, (2) wages remain firm, and (3) there is no prospect of tax relief. In spite of spending reluctance, he said, many manufacturers are realizing that new machine tools are necessary to lower costs. "As evidence of this, the industry has a greater volume of inquiries than at any time since the war."

In an informal press conference following the meeting, Mr. McDonald charged that government policy on depreciation is throttling a huge sales potential of the machine tool industry. As an example he cited an auto engine manufacturer who must change models after 2 years operation, but who requires a period of 18 to 20 years to depreciate the obsolete machine.

The machine tool industry has long been in the forefront in the fight for liberalized depreciation (THE IRON AGE, Jan. 1, 1948, p. 168). When asked what he thought would be a fair period of depreciation, Mr. McDonald said he believed the matter should be left to the discretion and sound business judgment of the business man. He said that corporations would be stymied in any effort to depreciate too rapidly because stockholders would object that the money was not being paid out in the form of dividends.

The average period of depreciation for machine tools in this country is now about 20 years, he said. Then he compared this with policy in other countries which ranged from a very few years to no restriction at all. He pointed out that the wearing out of machine tools in England had so drained that nation's productive capacity that "even a socialistic government had found it necessary to greatly liberalize its regulations on depreciation."

PERFORMANCE TEST: *Demonstrating actual performance of Carbon Tool steel in the Bethlehem Pacific booth at Bay Area Industrial Exposition, Oakland, Calif., is Earl Pearson, Oakland designer and builder of the Rotex Punch. Watching the operation are George Huck, of Bethlehem Pacific; Paul Childs, vice-president of E. M. Jorgenson Co.*

Completes Joint Rules In Renegotiation Of Military Contracts

Washington

• • • **The completion** of a joint set of rules for use by the Army, Navy, and Air Force, in the renegotiation of military contracts to recapture excessive profits, has been announced by Secretary of Defense Louis Johnson.

Part 428, "Statutes, Orders, and Directives," which is the last of a series of eight parts, has just been issued by the Military Renegotiation Policy and Review Board. This board, consisting of representatives of the three departments, is responsible for issuing renegotiation regulations and coordinating policies of the services.

The new part, largely informational, gives statutes which apply to renegotiation proceedings, applicable directives issued by the Secretary of Defense, and the renegotiation clause to be used in contracts. Excerpts from the Internal Revenue Code and Bureau of Internal Revenue interpretations which apply to renegotiation are also given.

The text of Part 428 has been published in the Federal Register, dated June 10, which may be obtained from the Government Printing Office, Superintendent of Documents, Washington 25, D. C.

Closes Down Hand Mill

Canton, Ohio

• • • **R. C. Ingersoll,** president, Superior Sheet Steel Div. of Borg-Warner Corp., announced recently that the rolling mill will discontinue operations indefinitely after June 30.

This hand mill was purchased by Borg-Warner in December 1946, with the full knowledge of the company that this type of mill would not remain competitive with modern strip mills in normal times. Mr. Ingersoll said, "The decision to close down the mill was made with great reluctance and regret." He said further that the management has made every effort to secure a source of supply of semifinished steel that might enable the company to remain in business and be competitive.

Superior has operated on a very close margin for years as it is not a fully integrated mill with steel making facilities. During the last decade many manufacturers of sheet bars, which is Superior's raw material, have discontinued making the product. Also, many former suppliers of sheet bars now use this product in their own integrated operations and this semifinished material is no longer available on the open market.

Illustrated Booklet Describes Steelmaking

New York

• • • **U. S. Steel** is beginning to distribute a new illustrated book called "Steel Making in America." The 100-page volume was prepared and published in response to thousands of requests which the corporation receives from school students and others for up-to-date information about steelmaking.

The book is being sent to science teachers, writers and editors, public libraries and schools and colleges throughout the country. In simple language it describes steel manufacture—from raw materials to finished products. It also includes a brief history of the iron and steel industry from earliest days to the present.

The historic range starts nearly 6000 years ago when the only iron known to man was extracted from meteorites. It continues to the present when there are 15,500 lb of steel transformed into useful things for every man, woman and child in America.

Of special interest was the discovery of iron ore in North America by Sir Walter Raleigh in 1585. Iron was first produced on this continent halfway between Boston and Salem, Mass., in 1644. The first American steel was made around 1725 at Simsbury, Conn. Pittsburgh began its existence as a leading steel center in 1792.

Carboloy Cuts Die Prices

Detroit

• • • **Carboloy Co.,** Inc., Detroit, has cut die prices on an average of 15 pct below the minimum prices on small cored dies. Simultaneously, an average reduction of 10 pct has been put into effect on rough-drilled and finished dies. The average reduction on larger cored dies is 20 pct.

All larger dies are now available at minimum cost, regardless of quantity.

Machine Tool Builders Exhibit Their Equipment

Springfield, Vt.

• • • **The four** machine tool builders of the Springfield-Windsor, Vt., area held a joint exhibit of their equipment during the week of June 20. Participating companies included Jones & Lamson Machine Co., Fellows Gear Shaper Co., and Bryant Chucking Grinder Co., of Springfield, and Cone Automatic Machine Co., of Windsor. Lovejoy Tool Co., Springfield, a manufacturer of small tools, displayed its line of products. Each company's exhibit was set up at its own plant.

J&L featured its 16-in. Fay lathes tooled for turning Ford stem pinions and 6¼ in. outer bearing races; a 6 x 30-in. universal thread grinder set up for multi-rib production grinding of threads; a new saddle type turret lathe equipped with a full length lead screw and a quick change gear box; and a line of J&L comparators and die heads.

Fellows Gear Shaper showed a complete line of gear shapers, shavers, generators, cutter sharpening machines, and gear inspection equipment. One of the latest designed machines in the exhibit was the No. 12 gear finisher set up to finish gear teeth on about a 5.3 pitch external gear. The Bryant exhibit included six of its internal grinding machines including the No. 126 heavy duty internal grinder with a 30-in. swing. A complete line of Bryant gages was shown, as was the use of the high frequency electric motor for grinder spindles, operating at 90,000 rpm.

Representative of its line of automatic screw machines were the models shown by Cone Automatic Machine Co. Included in the exhibit were: a 5-in., 4-spindle bar machine for short and medium-sized runs; a 1-in., 6-spindle bar machine with rapid change-over features to demonstrate high-speed production with carbide tools; a 1½-in., 6-spindle tooled with low cost tooling; a 1⅝-in., 4-spindle in operation on a high production job; and a 5-in., single spindle demonstrating various new features including an electronic drive application.

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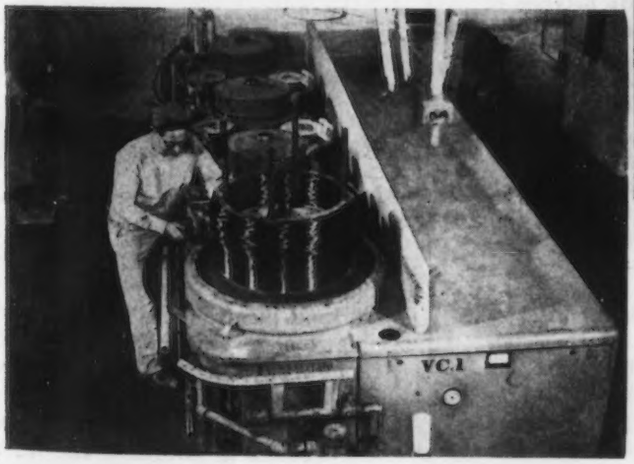
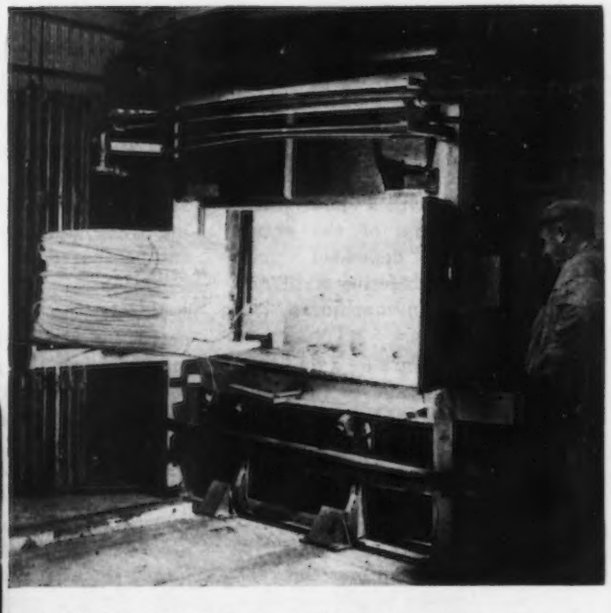
New Stainless Steel Mill Equipped to Process Wire Products

WIRE DRAWING (below) is done on specially designed equipment which have vertical motors. The new type wire-drawing blocks require less floor space than old types. Two on the end are called "bull-blocks" for heavy duty and eight in the foreground are for medium wire. All are water cooled and equipped with speed indicators to guide drawing speeds. The two heavies are driven with 100 hp, dc, 3 to 1 speed range motors; while the eight medium units have 50 to 60 hp, 3 to 1 motors.

FLASH WELDING (above) stainless steel rods together to make larger bundles. This is the first step in the mass production of stainless wire at American Steel & Wire Co.'s new mill in Waukegan, Ill. The welder makes 500 lb bundles and the bundles go to new type compressors which squeeze two of the bundles together to make a compact half ton coil which is then processed through the rest of the mill.

MANY CAREFUL STEPS (below) are required to draw stainless steel wire into its proper finished size. An intermediate job is performed on modern, continuous drawing machines like this one where heat-treated wire is drawn to a next-to-finished process size before further careful heat-treating and drawing. Worker takes a gage measure of the wire on the fourth draft of a continuous wire-drawing machine.





HOT STAINLESS steel rods (above) are being removed from one of the rotary hearth furnaces. The furnaces, heated to about 2000°F, are controlled electrically. When the predetermined cycle is completed, the operator approaches the furnace door which automatically opens, obtains the hot bundle from the furnace and deposits it upon the quenching platform located above the quenching tanks.

Construction Program For Power Industry To Be Completed in '51

Washington

• • • **Scheduled construction** in connection with the multi-billion dollar expansion program of the electric power industry will call for shipment of millions of dollars worth of generating and related equipment during the remainder of this year and 1950 and 1951.

Except for perhaps in the Northwest, end of 1951 will see the power supply ample for peak demands plus an excess of 15 pct for a security reserve margin. This is the opinion of Walker L. Cisler, executive vice-president of Detroit Edison Co.

This will be the net result of the industry's $9 billion postwar construction program which will be completed in 1951, he told the National Assn. of Electric Companies recently. Generating capacity will have been increased from 50.1 million kw in 1947 to 73.7 million by 1952.

Although the closing down of a number of electric steel furnaces has been felt by the industry, it was said, the slack has been taken up by increasing consumption in other fields. Demand by aluminum plants continues high and consumption for domestic purposes is on the rise.

Off to a slow start because of material scarcities and other obstacles including the time element in equipment manufacture, about 4.2 million kw new capacity was installed last year. This year, about 7 million kw in new capacity will go into place this year to bring the postwar program nearly half-way to completion.

If electric power construction is to keep to schedule, during the final 8 months of 1949 it will require shipment from manufacturers of equipment the equivalent of 4.4 million kw in generating capacity (in units of 4000-kw and larger) with related items.

This will bring total orders and shipments for the year to 6.3 million kw, not including 463,000 kw which industrial plants planned to install.

Generating capacity on order and scheduled for shipment in 1950 amounts to an estimated 6.4 million kw. For 1951, the figure is 4.6 million kw.

For this same period, industrial plants will add capacity totaling 600,000 kw to existing facilities. As of last January, industrial capacity was estimated at 13 million kw.

In terms of energy sources, approximately 72 pct of all capacities is fuel-generated—the burning of gas, liquid and solid fuels. The remaining 28 pct is generated by water power.

Under present plans, waterwheel generators needed in 1949, 1950, and 1951 (units of 4000-kw and over) are estimated at 1,550,000 kw, 831,000 kw, and 731,000 kw for the respective years.

50 YEARS AGO

THE IRON AGE, *June 29, 1899*

• "Among the minor iron producing countries none has experienced a more rapid growth in recent years than Russia. Americans have followed this development with a closer interest, since some of the enterprises have depended upon American engineering skill and upon American machinery."

• **"Extensive precautions against a shortage in Chicago's supply of natural gas are to be taken."**

• "The city of Chicago has just completed a police census and claims a population of 2,088,043. The work of compiling the census was done by police precincts and the returns were made by patrolmen."

• **"The developments of the steel trade in late years have brought into use remarkable changes from the type of rolling mill existing in the days of puddled iron."**

• "A Western subscriber desires copies of THE IRON AGE for Aug. 12 and Dec. 30, 1897. Our Chicago office, 805 Fisher Bldg., will be pleased to hear from anyone in the vicinity having these issues on hand which can be spared."

• **"A decree has been just enacted by the Belgian government raising the prohibition on the importation into Belgium of American cattle and swine."**

• "In order to encourage the development of their merchant marine the Russian government have decided to pay the Suez Canal dues of Russian steamships for the next 10 years, as the Austrian government have done for some time."

• **"One of the burning questions of the day in the metallurgy of iron is the utilization of blast furnace gas for the production of power through the intermediary of gas engines."**

Labrador Iron Ore May Benefit New England

Durham, N. H.

• • • **Wallace Dickson,** publicity director for the New England Council told the New Hampshire Executive Management Institute recently that the "huge Labrador iron ore deposits will be tapped in 1952, 1 year ahead of schedule, and it can be delivered to New England at the same price the Mesabi ore reaches Duluth."

"The Labrador ore owned by the Hillinger-Hanna Co. is understood to be richer that that mined at the Mesabi fields in Minnesota." he added.

The speaker said, that between 1939 and 1947, 2000 new metalworking plants added 200,000 people to New England's area. The rapid growth of metalwork in New England gives the region added interest in the vast, high-grade iron ore deposits in Labrador and Quebec.

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Cox Discusses Outlook When Backlogs Are Gone

Chicago

• • • **"When the Backlogs** Are Gone" was the subject chosen by Charles R. Cox, president, Carnegie-Illinois Steel Corp., in a talk before the National Assn. of Purchasing Agents here recently.

According to Mr. Cox, "The big issue of whether or not we are some time to fall back into a period of prolonged unemployment, hinges quite specifically on whether there will be confidence, ingenuity, enterprise, savings and capital investment to provide new tools of production."

He pointed out that risk capital as such has dried up and went on to say, "We must bear in mind that new capital is ventured only in the hope of profit, or the prevention of a loss. If the atmosphere is hostile to making a profit then capital venture and new projects will diminish."

He cited the many pronged attacks now being leveled at profits; (1) heavy taxation and double progressive taxation of corporate profits; (2) the fact that profit has become the occasion for a demand by labor that it be promptly dissipated in increased wage costs to the price detriment of consumers; (3) government direct or indirect insistence that controls be set up under which prices of products would have to be sold at less than buyers are competitively willing to pay; (4) government interest in the production of goods otherwise competitively marketed; and (5) the fact that "we are on an irredeemable paper money standard. If people are to engage in long term undertakings they must have long term confidence in the money in which those undertakings are measured."

Carnegie's president, in discussing labor, declared, "As workers succeed in forming labor organizations which approach monopolies, they may be shutting off their employer from other sales outlets. But by that very act they are also shutting out other workers from being able to secure productive employment. Thus step by step such actions tend to become restrictive and thereby result in the loss of individual independence.

BECAUSE THEY ARE QUIET and fume-free, battery industrial trucks can be used in virtually any part of the plant. They can even be provided with spark-enclosed construction if fire and explosion hazards exist.

They use low-cost electric power and use it with peak efficiency . . . starting instantly, consuming no power during stops. Their electric motors have few wearing parts; are easy to maintain; rarely need repairs. Thus they have inherent economy and dependability.

They are doubly dependable and economical when powered by EDISON Nickel-Iron-Alkaline Storage Batteries. These are the longest-lived and most durable of all batteries, with steel cell construction, electrolyte which is a preservative of steel, and a foolproof principle of operation.

If you do not already use EDISON, get a current price quotation —you will probably find initial cost *much lower* than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES: They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

695 Tons, El Monte, Calif., bridge across San Gabriel River on Valley Blvd., through W. J. Distelli, Los Angeles, to Bethlehem Steel Co., Inc.

600 Tons, New York, Columbus Presbyterian Medical Center, University Hall, to Grand Iron Works, N. Y.

200 Tons, Boston, reconstruction of Water St. underpass for Boston approach Mystic River Bridge, through Coleman Bros. Corp. to Groisser & Shlager Iron Works, Somerville, Mass.

140 Tons, Long Beach, Calif., David Star Jordan high school gymnasium, through Stanton-Reed Co., Los Angeles, to Pacific Iron & Steel Co., S. Alameda, Calif.

100 Tons, Cheatham Co., Tenn., highway bridge, to Virginia Bridge Co., Birmingham, through Foster-Creighton Co., Nashville.

• • • **Fabricated steel inquiries** this week included the following:

4100 Tons, Bronx, New York, viaduct.

1150 Tons, McNary, Ore., gate leaves for lower spillway, spillway dam, McNary Dam, Walla Walla District, Corps of Engineers, Inv. No. Eng-45-164-49-117, bids to July 14.

• • • **Reinforcing bar awards** this week included the following:

325 Tons, El Monte, Calif., bridge across San Gabriel River on Valley Blvd., through W. J. Distelli, Los Angeles, to Bethlehem Steel Co., Inc.

260 Tons, Blue Island, Ill., community house, through James Duffy Construction Co., Chicago, to Dean Steel Co., Chicago.

195 Tons, Long Beach, Calif., David Star Jordan high school gymnasium and pool, through Stanton-Reed Co., Los Angeles, to Rutherford-Skoubye.

125 Tons, Oak Forest, Ill., nurses home to Ceco Steel Products Co., Chicago.

• • • **Reinforcing bar inquiries** this week included the following:

690 Tons, Chicago, State Tubercular Hospital.

570 Tons, Cook Co., Ill., dormitory for interns and visitors.

230 Tons, Los Angeles, bridge across Compton Creek Channel on Santa Fe Ave., Calif. Div. of Highways, Los Angeles, bids to July 21.

120 Tons, San Diego, bridge on County Road HC 13-1, County Clerk, San Diego, bids to July 11.

Briggs Official Reminds Enamelers to Stress The Finish of Their Product

Cleveland

• • • **People who make** porcelain enameled steel plumbing fixtures are missing a bet if they don't stress its "easy-to-clean" qualities. This, with emphasis, was the message delivered by O. F. Depperman to the third annual sales management conference of the Porcelain Enamel Institute, held here late in June.

The successful function of bath room fixtures depends on their finish, he noted.

"Our products will not wash, soak or spin clothes dry . . . or bake a cake. Is it any wonder, then," he asked, "that the entire steel plumbing fixture industry decided it would have to offer an easier-to-clean porcelain enamel finish?"

Mr. Depperman, who is director of market development, Briggs Mfg. Co., was referring to the acid resistant finish which the industry began applying to steel plumbingware about 10 years ago. Until then common practice was to heat cast iron fixtures cherry red, spray on frit and return them to the oven to melt the frit and produce the enamel finish. Today a cream-like slurry is sprayed onto cold fixtures which are then fired. All steel plumbing ware is enameled by this process. All cast iron ware is not.

Mr. Depperman, concluding that the housekeeping job today also includes appliance cleaning, pointed out that manufacturers might get some powerful copy by stressing the "stainproof" qualities of their product.

Employment Holds Steady

Detroit

• • • **Industrial employment** in Detroit is being maintained although the Power Index for the Detroit area showed a sharp decline during May 1949, according to John R. Stewart of the industrial department of the Detroit Board of Commerce.

Based on 1935-39 monthly averages, the employment index for May 31 was 148.2 compared to 126.3 for May 15. A year ago the employment index was 124.7.

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over $100,000,000 for Rustproofing
Tuna clipper being sprayed with zinc. Portable spraying equipment in foreground. Courtesy Metallizing Engineering Co., Inc. Long Island City, N.Y.
(above) A rack of electrogalvanized conduit just removed from zinc electroplating tank. Courtesy The National Supply Co., Pittsburgh, Pa.
(below) Drum containing screws being loaded into gas-heated sherardizing furnace for tumbling in zinc vapor atmosphere. Courtesy Zinc Development Association, Oxford, England.
Hot-dip galvanizing line showing control station and zinc-coated sheets emerging from pot in left background. Courtesy U. S. Steel Corp.
TIME . . . unrelenting proving ground—has firmly established the superiority of zinc as a protective coating for iron and steel. The largest single peacetime use of zinc is in the form of metallic coatings. In 1948, for example, more than 45% of the metallic zinc consumed in the United States, or 365,000 tons costing approximately $102,500,000, was used for this purpose. This does not include the amount of the metal used as zinc dust, zinc oxide, lithopone and other zinc pigments in paints, and it is safe to say that about half of the entire production of zinc is used for protecting other materials, but notably iron and steel. In order of tonnage of zinc consumed in their production, hot dipped coatings stand first, followed by electroplated, sherardized and sprayed coatings. Considering that for economical and mechanical reasons the protective zinc coating is relatively thin, it can readily be appreciated that the tonnage and dollar value of iron and steel products thus rustproofed annually is practically incalculable.
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INTERMEDIATE
ST. JOE
Electro Thermic
ZINC
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"Millions for Defense but not One Cent for Tribute"

* *Made by Charles Cotesworth Pinkney, U. S. Minister to France in 1796, in reply to the French Government's demand for a "loan"—in reality for a gift—in return for which Murat offered to prevail upon the pirates harbored in French-dominated North African ports to cease the hijacking of U. S. merchant ships in those coastal waters.*

This famous statement * could well be adopted as a slogan by producers of galvanized iron and steel products. As pointed out in the advertisement reproduced above in miniature, over $100,000,000 worth of zinc was used in 1948 to coat iron and steel products in order to minimize the tribute exacted annually by the elements in the form of rust and corrosion.

"ST. JOE Electro-Thermic ZINC and GALVANIZING" is a new 16-page, 8½x11" illustrated booklet containing reprints of six St. Joseph Lead Company advertisements covering the various zinc coating methods employed today: Hot dip galvanizing, electrogalvanizing, sherardizing and spraying. Additional data of interest to producers and fabricators of zinc coated iron and steel products have also been included. Copies of this booklet are available upon request to companies in these industries.

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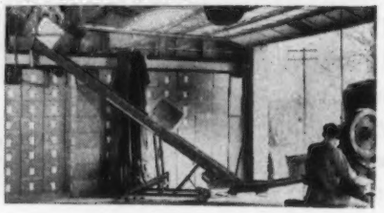
Yes, all you need is one man at the stockpile and one man in the truck to receive the load. You'll save steps and time . . . enough time to pay for your conveyor again and again.

The new Buschman TROJAN Portable belt conveyor and Buschman standard roll or wheel conveyor units give you a handling team that's really versatile . . . THE TROJAN is quickly and easily changed from job to job. Sturdy construction, an unusual unit priced right. Feeder belt optional.

For full details write for Bulletin No. 50



Buschman Conveyors

The E. W. BUSCHMAN CO., Inc.
4430 Clifton Ave., Cincinnati 32, Ohio

Potential High-Grade Coking Coal Found In Utah Mining District

Salt Lake City

• • • **Extensive drilling** tests have proved a potential new source of more than 30 million tons of high-grade coking coal in the rich mining areas of central Utah, according to Kaiser Co., Inc.

Studies of facilities have already begun looking towards opening and operating the new coal properties to supply coking coal for the expansion of the Henry J. Kaiser steel plant at Fontana, Calif.

The new coal deposits lie in 2560 acres of land which Kaiser Co. last year leased from the U. S. Dept. of Interior, some 24 miles east of the town of Price, Utah. The tests disclosed coal seams from 11 to 14 ft, thus insuring low mining costs.

In addition Kaiser Co. was recently granted a lease by the State of Utah on 480 acres of coal lands in the vicinity of the larger property, making the total acreage 3040.

The newly proven deposit is located in the famous Book Cliffs field which already supplies the vast coking requirements of the iron and steel plants at Fontana, Calif.; Ironton and Geneva, Utah.

Prior to opening the new mine, shipments will continue to be made from the existing Kaiser Co. leased mine in the same district. The high quality of coking coal from this new deposit has already been proven at the Fontana plant, the company stated.

The additional supply of coking coal is planned in connection with the second blast furnace and 45 additional byproduct coke ovens under construction at Fontana. These facilities are part of a $35 million expansion program at the Fontana plant which will include a new hot-rolled strip mill.

Begins New Dining Hall

Providence

• • • **Arthur B. Homer,** president of Bethlehem Steel Co. and head of the housing committee, pulled the lever on the steam shovel that recently scooped out the first shovelful of dirt for Brown University's new $1 million dining hall.

Tool Manufacturers Cut Unnecessary Expenses

Boston

• • • **That large and small** tool manufacturers are hard put for business is putting it mildly. Things could be worse, however, but because the trades still have a war-boom days hangover, they don't talk that way.

Some of New England's conservatism was lost in those lush war days, but it has come back with a bang. Every tool manufacturer is moving very cautiously these days, cutting expenses where possible via reducing operating hours, erasing or cutting to the bone bonuses, slicing or eliminating dividends and, in the case of Brown & Sharp Mfg. Co. and others, figuring on extended vacations.

In the case of Brown & Sharp Mfg. Co. workers are anxiously waiting for July 15. On or before that date management will tell workers whether the Providence plant will reopen Aug. 16, when employees are scheduled to return from vacations. It all depends on the status of business, says the management.

Auto Production for First Half 1949 Sets Record

Detroit

• • • **Whatever may occur** during the final 6 months of 1949, the first half of this year will go down as the most productive period in the history of the automobile industry.

Estimates place the production of cars and trucks in U. S. and Canadian plants through June at 3,096,000 units. If this pace could be maintained through the remainder of the year more than 6 million units would be assembled in U. S. and Canada. The all-time high record of 5,621,045 was established in 1929.

According to Ward's Reports, U. S. car and truck assemblies for the first 6 months of 1949 totaled 2,335,000 cars and 625,000 trucks.

It will be recalled that this record was achieved despite strikes, sporadic material shortages and shutdowns for model change-overs by Chevrolet and the Chrysler divisions.

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the Greatest Name in Solder!

THERE is a reason for Kester's tremendous success in the industrial field. A staff of highly-trained technical engineers and a half-century of Kester "know how" are teamed to bring you the finest flux-core solders made.

As a measure of this ability, Kester produces over 100,000 different types and sizes of flux-core solders.

Contact Kester's Technical Department on your soldering problems. There is no obligation.

WRITE FOR THE NEW, FREE MANUAL—"SOLDER AND SOLDERING TECHNIQUE"

A complete analysis of the application and properties of soft solder alloys and soldering fluxes.

1899 50th Anniversary 1949

KESTER SOLDER COMPANY
4201 Wrightwood Avenue, Chicago 39, Illinois

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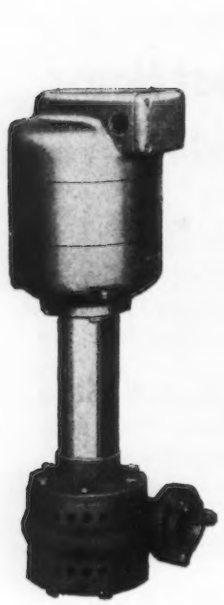
KESTER SOLDER

Follow the Leaders...

Use RUTHMAN GUSHER COOLANT PUMPS

Photo Courtesy The Lima-Hamilton Corporation

This Niles Heavy Duty Axle Lathe manufactured by the Lima-Hamilton Corporation is equipped with a Model 11022 Ruthman Gusher Coolant Pump.



The leading machine tool manufacturers all over the country use Ruthman Gusher Coolant Pumps as standard equipment on their machines. They know from experience that the ***exclusive features*** built into every Ruthman Gusher Pump gives them a pump which will satisfy the most rigid requirements.

You too can be sure of this efficient dependable service when you specify Ruthman Gusher Coolant Pumps on your metal working equipment.

Write for our new catalog today.

THE RUTHMAN MACHINERY CO.

1821 READING RD. CINCINNATI, OHIO

(CONTINUED FROM PAGE 90)

line of division in Europe and Russian abandonment of the attempt to harry the western Powers out of their exposed position in Berlin. For the time being, at least, the cold war in Europe has ceased to be a war of movement. Both sides have taken to the trenches and the trial between them which, in the strenuous days of the airlift, was a genuine trial of strength, may now become an even more testing trial. A trial of nerves and staying power. As General Bedell Smith has reminded the American people,

> the Soviet tactic will be to attempt to wear us down . . . to keep probing for weak spots they can exploit. I am convinced that the Russians believe they are playing a game of patience in which they can outlast us.

THIS, then, may well be the nature of the new phase which has opened at Paris—the change from the cold war of movement to the cold war of position. No evidence suggests that the Russians' hostility to the West is any less, but they no longer believe the western position can be destroyed by frontal attack. They are ready to play a waiting game. Both sides are thus in the same position. The western Powers have never envisaged the use of force, although Russian provocations in Berlin compelled them to consider it. But if force is excluded, patience is the only weapon. The fateful question for Europe is now which side will wield the weapon to greater effect.

The western Powers can hope that the inevitable history of dictatorship will run its course in Russia as it has elsewhere. No dictatorship has yet completely solved the problem of succession, and in Russia in particular periods of aggressive expansion have been followed by retreat. The stresses in the Soviet-dominated half of Europe created by the conflict between indigenous communism and remote control from Moscow may also in time serve to weaken the Russian hold. There are thus cracks in the Soviet monolith. They are the West's best hope.

BUT it would be unwise to underestimate the weaknesses among the western countries. In the first place, their political and military

strength depends upon a coalition largely brought together by common fear. If the pressure is removed, the alliance stands in danger of springing apart. In the economic field the western Powers have yet to prove that they can overcome the deep disequilibrium between the United States economy and the rest of the world. Nor have they yet proved that they can master their old enemy, the onslaught of depression. The men in the Kremlin have watched for four years for the coming of the American recession, believing that declining markets, unsalable surpluses and mounting unemployment would do their work for them. The West has yet to prove them wrong.

But perhaps the greatest challenge offered by the war of position and the waiting game is the instinctive impatience of free public opinion. The electorate in a democratic community is not psychologically prepared for the lengthy commitments of true statesmanship. It can, spurred by evident danger, climb the hill, but it detests the long exposure of staying indefinitely, motionless, in the cold winds on top. American opinion, in particular, with its secular tradition of isolated security, does not yet see that statesmanship, defense, alliances and strategy may all, like genius itself, consist in a long patience. The western world now needs more than anything else the staying power which abides by decisions taken and follows through to the end the policies upon which it has embarked. It may even be that the Paris conference has brought to an end the easiest stage in the western Powers' postwar diplomacy. The real testing time lies ahead.

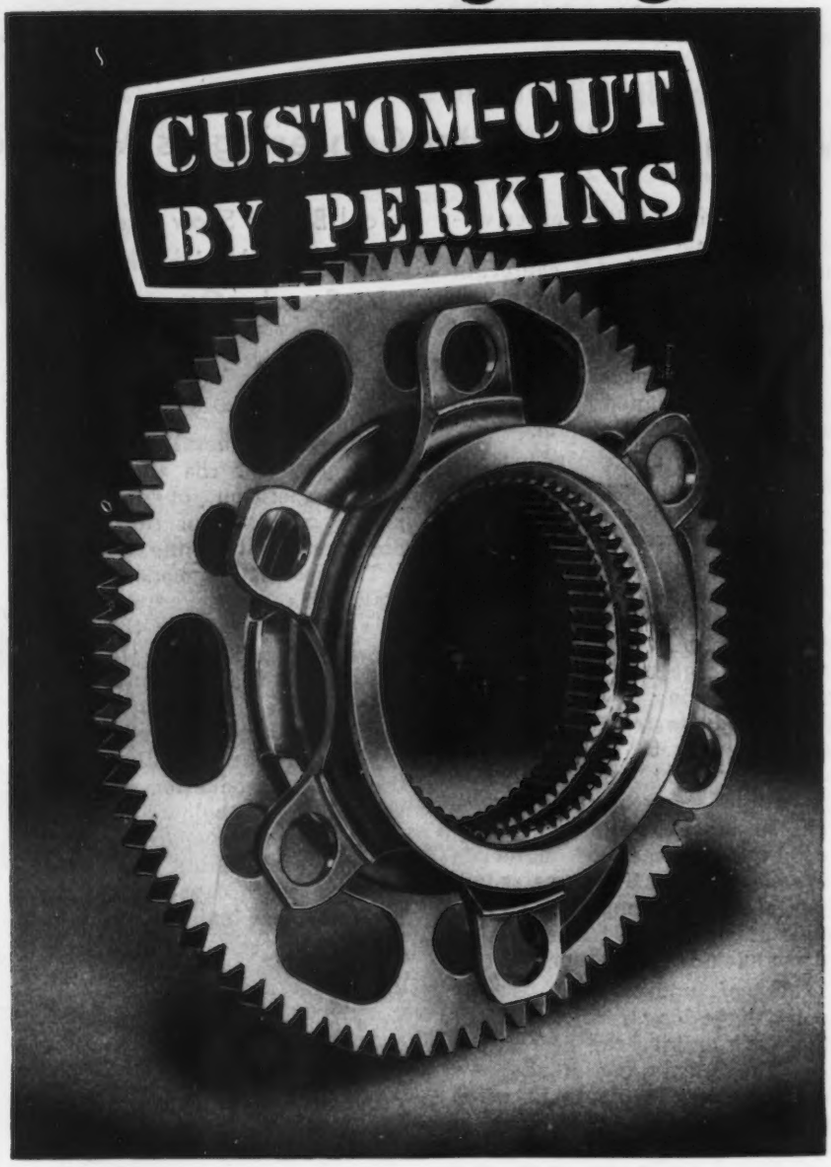
Made Assistant Chairman

Chicago

• • • **Harold C. Miller** has been appointed assistant chairman of the physics department of Armour Research Foundation of Illinois Institute of Technology.

Mr. Miller, who was formerly vice-president in charge of research and engineering for Charles Hardy, Inc., New York, will be technical director of the physics department's electricity and magnetism section and of the high pressure laboratory. He joined the Foundation staff Mar. 15 as associate supervisor of the electricity and magnetism section.

AIRCRAFT engine gears



The highly complex gear shown here, is an example of the exacting production jobs entrusted to us regularly by many of the country's leading manufacturers of aircraft engines. Moreover, our ability in the field of gear engineering extends into practically every industry. Thus a vast amount of *all* types of equipment in use right now has been built at less cost and operates more efficiently because Perkins' engineers checked the customers' blueprints and specifications prior to manufacture.

Broad experience both in the application and manufacture of all types of gears has equipped our staff to bring to your project a highly specialized knowledge of power transmission problems.

For the manufacture of the highest quality gears in production quantities, consult PERKINS first.

PERKINS MAKES—in all materials, metallic and non-metallic—Helical Gears, Bevel Gears, Ratchets, Worm Gears, Spiral Gears, Spur Gears with shaved or ground teeth, Ground Thread Worms

PERKINS MACHINE & GEAR Co., West Springfield, Mass.

MACHINE TOOLS

. . . News and Market Activities

Machine Tool Industry Centering Its Attention On New Equipment

• • • **Harried by** falling order volumes, the machine tool industry and its customers are centering their attention on the new developments in automatic tools, automatic transfer machines, production speeding accessories and equipment designed to reduce setup time to the minimum.

Tool buyers, confronted with a sharply declining market for their products, see labor rates fixed at what is considered by many to be an excessively high level. For some time, it appears, there may be little or no possibility of major reductions in wage rates. The problem of the tool buyer, therefore, is to bring down the prices of his products to meet customer demands and to stimulate the market, without any immediate prospect of corresponding reductions in labor, freight and overhead costs. Prices of materials have come down. But these reductions alone have not been significant enough to build a market at a time such as the present.

The tool industry and its customers have long recognized that important savings can be realized by taking advantage of the new developments in tooling, often coupled with better methods of handling materials in the plant. Both of these projects are directed toward higher rates of production and savings in plant labor costs.

The new developments in the tool industry involve simplified operation, easier and quicker setup, the use of combination tools and accessories and automatic combinations of tools to operate on a production line basis. The principal objective is to simplify the work of the operator and permit the machines to pace the man rather than to have the man pace the machines.

Competition in the metalworking field is very keen. One aftermath of the war was the large number of war-born job shops remaining in business to compete with the established metalworking

Tool Buyers Show Interest In Machines Which Simplify, Speedup Operations

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plants. With generally lower overhead costs for the small plants, the competition of the larger plants must be on the basis of highly efficient tooling.

The cost of the modern tool installations of the advanced type is very much higher than many prewar installations. Oftentimes the cost of the electronic control systems used for many of these installations equals or exceeds a typical prewar installation. But the cost of production per unit is very often well below prewar costs when the market permits operating on a reasonably steady basis. If not used to capacity, the overhead on these installations is very high.

Those who have had an opportunity to study the unit cost figures on typical automatic transfer machinery installations and compare them with previous unit production cost figures say that the difference is astounding. But the capital expense of such installations is tremendous. Only the automobile manufacturers have so far been able to justify the investment in the large and fully automatic transfer machines. With constant improvements always adding to the expense of the new installations, the cost of the auto manufacturer's production lines is very high indeed. But this investment is the principal method for bringing down the price of cars to the consumer.

In recent years, tool buyers have been attempting to protect themselves from the hazards of carrying heavy overheads on inactive production lines by reducing the period in which an installation must pay for itself. Two-year periods have been common practice. Some buyers have insisted on recovery of the cost in one year. With the right type of installation, such periods are very often realized. There have even been cases where installations have paid for themselves within 6 months.

Under present business conditions, the likelihood of being able to operate at a rate sufficient to recover the investment within a limited time is much more remote than 6 months ago. According to informed observers, this is the underlying reason that dealers and builders are being flooded with inquiries, out of which relatively few orders develop.

So far there has been no significant opposition by labor to the installation of the fully or semi-automatic tool production lines. Yet each installation serves to displace operators. It would be very difficult for labor to take a position of opposition to such installations while demanding higher wage rates and fringe benefits, coupled with lower prices to the consumer. The first development along these lines might well be expected to originate in Detroit where the production line technique is further advanced than elsewhere.

New machine tool orders and shipments were down in May compared with April, according to the index figures reported by the National Machine Tool Builders' Assn. New orders were down by 6.4 points to a level of 63.7, based on the dollar valuation of average monthly shipments in the 3 years from 1945 through 1947 taken as 100. The drop in new orders was caused solely by a loss of 7.2 points in the foreign business during the month, bringing it down to 15.9. The big drop in domestic business was in April when the index dropped by 23.4 points, even with a slight increase in foreign business. Shipments in May were down by 1.9 points to 72.8.

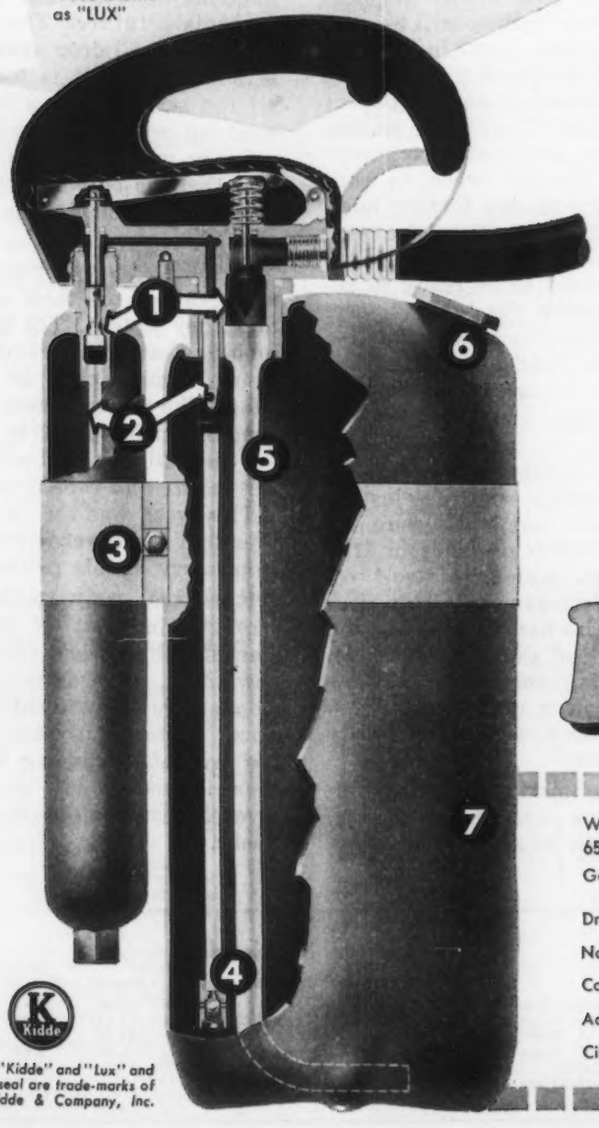
UNIVERSITY OF MICHIGAN LIBRARIES

A New DRY CHEMICAL EXTINGUISHER WITH Trigger-Finger Control

(nothing new to learn)

Here, at last, is an extinguisher that's designed *right* to make the most effective use of an effective fire-extinguishing agent. *Kidde* Dry Chemical Extinguishers—made in 20- and 30-pound capacities—are operated simply by pulling a trigger—the same familiar, time-tested method used on all *Kidde** carbon dioxide (CO_2) extinguishers.

*Also known as "LUX"



PLUS these 10 other big features

1 *Simultaneous opening of CO_2 and powder valves.* No trapping of gas pressure in powder chamber *before* the discharge starts.

2 *Quicker transfer of pressure to powder chamber.* Siphon tube carries CO_2 to outlet in powder chamber, where it expands to a gas.

3 *CO_2 cartridge easily replaced.* Just loosen name band holding cartridge—then unscrew cartridge. Same size cartridge for both 20- and 30-pound extinguishers.

4 *CO_2 fluffs up powder—prevents packing.* Small port at bottom of CO_2 outlet tube allows gas to stir up powder.

5 *Powder discharges from top through siphon.* No danger of packing at hose connection.

6 *Powder filler cap needs no tools.* Unscrews easily for refilling of extinguishers in the field. Filler cap is safety-vented.

7 *Lightweight cylinder for ease of carrying.* Pound for pound, the *Kidde* Dry Chemical Extinguisher packs more fire-fighting punch!

8 *Better powder dispersion pattern.* Diffusion baffle in horn gives greater coverage, more effective application. No shut-off valve in horn to trap powder under pressure in hose. No rodding out of hose after use.

9 *Extinguisher tested for operation at* −40°F.

10 *Improved powder and packaging.* Powder specially processed to make it free-flowing; packed in weatherproof containers. 30-pound carton contains three 10-pound cans —for easy refilling of either 20- or 30-pound extinguishers. 50-pound containers also available.

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Kidde

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Please send me further information on the *Kidde* Dry Chemical Extinguisher.

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Company.....

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The words "Kidde" and "Lux" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

NONFERROUS METALS

. . . News and Market Activities

Action On Stockpiling Measures Is Tonic for Metals Markets

New York

• • • **News of the** Congressional action on the two stockpiling measures acted like a tonic on the metal markets last week and served to firm up the copper and lead markets, particularly. There was no appreciable effect on the zinc market because slab zinc will not be bought for the stockpile in the next fiscal year.

The President has signed the second Deficiency Appropriation Act in ample time to permit the Federal Bureau of Supply to place orders for the $40 million in new stockpiling funds which it provides before its expiration date on June 30. The measure also provides for $270 million in contract authority which may be awarded and charged to the fiscal year 1949. Plans have already been completed by the Munitions Board for the placing of this business. These funds will not, of course, be earmarked solely for nonferrous metals.

In addition to the funds provided for stockpiling before the end of June, the Treasury and Post Office Appropriation Bill provides $525 million for stockpiling in the next fiscal year. This bill is set to be reported out by conference committee from which it is expected to be passed into law without delay.

The tonnage objective of 90,000 to 100,000 tons of copper from United States producers which has already been published is substantially correct, it has been learned from an authoritative source. The tonnage of copper to be acquired from Canadian producers is quite flexible and may well be considerably below the figure of 50,000 tons which has been published. In this event, the balance of the tonnage would probably go to U. S. producers.

Published reports, which could not be confirmed, indicate that lead will be stockpiled to the extent of 150,000 to 200,000 tons in the next fiscal year. Reports also indicate that 50,000 to 60,000 tons of lead will be purchased during the third quarter of the year.

Markets Are Now Rated Firm; Price Reductions Not Regarded Imminent

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Although government requirements for stockpiling will be well below tonnages now in surplus supply, the imminence of the government has had a stabilizing effect on the market. The copper market has seen an appreciable pickup in volume in the last week, in both domestic orders and foreign business. Brass mills which have been out of the market for some time are understood to be ready to reenter the market for July delivery. In some cases this will be the first worthwhile tonnage placed in months. In the meantime their inventories have been reduced appreciably.

The lead market has strengthened considerably in the last 2 weeks. Sales last week were reported at 7068 tons, up from 4153 a week ago, which in itself reflected an improvement. This situation has also had its effect on the secondary lead and scrap markets. The smelting charge for battery plates has been reduced by $10 a ton in a week to a range of $50 to $55 a ton.

The zinc market has not improved to a comparable degree, but it can be expected that there may be some sympathetic improvement. Curtailment of mine production is still going on in this metal, as there are many producing units that can only suffer losses at present prices. The most recent information is that mine producers in Mexico and New Mexico have suspended shipments to custom smelters.

As the result of all these developments there is very little likelihood of any further price reductions in copper and lead in the immediate future. The zinc market might well drop again but this is not certain. It is learned that all the scrap markets have tightened up with the firming of the primary markets. It is estimated that there is only 10 pct as much copper scrap moving as 6 months ago.

In May, the fabricators used more copper in their operations than they bought. The brass mills report that their orders have shown some pickup in May and June. The improvement has been confined principally to products for the building field such as copper tubing and roofing sheet.

This week was the first in some time that there were no reductions in primary metals prices.

It is too early to tell if the strength in most of the metals markets this week represents a new trend. It is clear that it has stopped the downward march of prices in recent weeks. Whether the present prices can be held or even increased will probably be severely tested within the next few weeks.

Nonferrous Metals Prices

	June 22	June 23	June 24	June 25	June 27	June 28
Copper, electro, Conn.	16.00	16.00	16.00	16.00	16.00	16.00
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	9.00	9.00	9.00	9.00	9.00	9.00
Lead, St. Louis	11.85	11.85	11.85	11.85	11.85	11.85

Note: Quotations are going prices.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	16.00
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	11.85
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$82 to $84
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	9.00
Zinc, New York	9.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	13.75*	15.50
No. 120	13.25*	15.00
No. 123	12.75*	14.50
80-10-10 ingot		
No. 305	....	20.00
No. 315	....	17.00
88-10-2 ingot		
No. 210	....	26.50
No. 215	....	23.50
No. 245	16.50*	18.25
Yellow ingot		
No. 405	11.50*	13.25
Manganese bronze		
No. 421	....	18.00

* f.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	19.00-19.50
0.60 copper, max.	18.50-19.00
Piston alloys (No. 122 type)	16.00-16.50
No. 12 alum. (No. 2 grade)	14.75-15.25
108 alloy	15.50-16.00
195 alloy	17.00-17.50
13 alloy	18.50-19.00
AXS-679	15.75-16.25
5% Ti, Aluminum, f.o.b.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-95½%	15.75-16.25
Grade 2—92-95%	14.75-15.25
Grade 3—90-92%	13.75-14.25
Grade 4—85-90%	12.75-13.25

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	31.84
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅝
Zinc, oval, 99.886, f.o.b. Detroit	22½
Ball anodes	20½
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbl.	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to $1.07; 35 to 37, 45.7¢ to $1.65; 47 to 49, 67.5¢ to $2.41.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅝ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅝ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	30.68	....	30.28
Copper, hot-rolled	.. ....	26.53	....
Copper, drawn	....	27.78	....
Low brass	27.97	27.66	30.88*
Yellow brass	26.77	26.46	29.78*
Red brass	28.36	28.05	31.27*
Naval brass	31.77	25.83	27.08
Leaded brass	....	21.34	25.47
Commercial bronze	29.28	28.97	31.94*
Manganese bronze	35.27	29.18	30.68
Phosphor bronze, 5 pct	48.92	49.17	....
Muntz metal	29.78	25.34	26.59
Everdur, Herculoy, Olympic, etc.	34.63	33.58	....
Nickel silver, 10 pct	37.80	40.14	40.34
Architectural bronze	....	....	25.47

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	13¼	12½
Yellow brass	10¾	10
Red brass	11⅞	11⅛
Commercial bronze	11⅞	11⅛
Manganese bronze	10¾	10
Leaded brass rod ends	10½	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	12.00
No. 2 copper wire	11.00
Light copper	10.00
Refinery brass	9.50 to 9.75*
Radiators	6.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	12.00
No. 2 copper wire	11.00
Light copper	10.00
No. 1 composition	9.00
No. 1 comp. turnings	8.50
Rolled brass	7.00 to 7.25
Brass pipe	8.25
Radiators	7.25
Heavy yellow brass	6.75
Aluminum	
Mixed old cast	7.50
Mixed old clips	7.50
Mixed turnings, dry	6.00
Pots and pans	7.50
Low copper	11.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	10 —10½
No. 2 heavy copper and wire	9 — 9½
Light copper	8 — 8½
Auto radiators (unsweated)	5¾— 6
No. 1 composition	7¾— 8
No. 1 composition turnings	7¼— 7¾
Clean red car boxes	6½— 6¾
Cocks and faucets	6½— 6¾
Mixed heavy yellow brass	5¼— 5½
Old rolled brass	5¾— 6
Brass pipe	6¾— 7
New soft brass clippings	8½— 9
Brass rod ends	6½— 7
No. 1 brass rod turnings	5½— 6
Aluminum	
Alum. pistons and struts	3¼— 3½
Aluminum crankcases	5 — 5½
2S aluminum clippings	9 — 9½
Old sheet and utensils	5 — 5½
Borings and turnings	3
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½
Zinc	
New zinc clippings	4½— 5
Old zinc	3 — 3½
Zinc routings	2 — 2½
Old die cast scrap	2
Nickel and Monel	
Pure nickel clippings	16 —17
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	10½—11½
Clean Monel turnings	6 — 7
Old sheet Monel	8 — 9
Old Monel castings	7 — 8
Inconel clippings	10 —11
Nickel silver clippings, mixed	6 — 7
Nickel silver turnings, mixed	5½— 6
Lead	
Soft scrap, lead	7 — 7½
Battery plates (dry)	4¼— 4½
Magnesium Alloys	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	9 — 9½
Solder joints	10½—11
Siphon tops	45 —47
Small foundry type	11½—12
Monotype	9½—10
Lino. and stereotype	9 — 9½
Electrotype	7 — 7½
New type shell cuttings	8 — 8¼
Hand picked type shells	4
Lino. and stereo. dross	5 — 5½
Electro. dross	3½— 4

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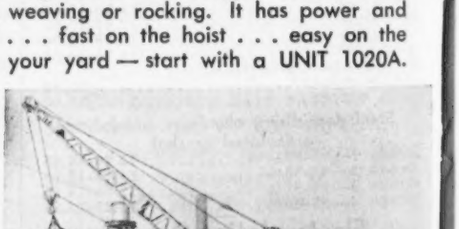

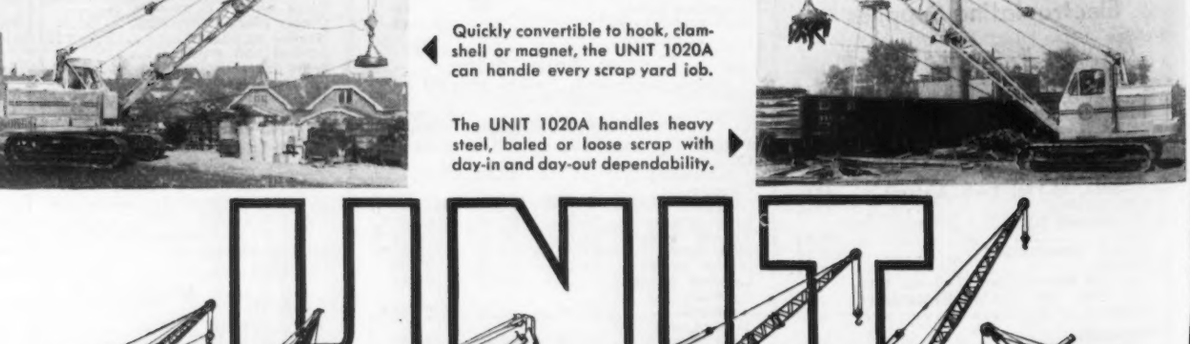

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SCRAP

. . . News and Market Activities

Prices Slip Further In Feeble Market

New York

• • • **All market areas** showed further weaknesses as the downward trend of prices continued. Vacation periods have already cut into the limited amount of scrap being consumed by the mills and foundries. Some consumers will be out of the market during July and others have limited their purchases—at least for the present time.

THE IRON AGE scrap composite dropped another 92¢ per gross ton this week. It is now $19.33 per gross ton, a new low for the year. This represents a drop of $23.67 per gross ton since the first of the year. Prices of No. 1 heavy melting steel this week are: Pittsburgh, $20.50 to $21.00; Chicago, $19.50 to $20.00; and Philadelphia, $17.00 to $18.00.

With the approach of vacation periods, consumers have been buying less scrap from week to week. Cutbacks in steelmaking operations have also had their effect on the amount of scrap which is needed. Many scrap purchases have been for the sole purposes of averaging down some of the higher-priced material.

The possibility of a steel strike is being felt in scrap circles. A number of industrial scrap lists now contain a clause requiring the buyer to take delivery regardless of strikes, embargoes, etc. This means that in the event of a steel strike the broker would have to lay down the material—a risk few can afford at this time.

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PITTSBURGH—At least 2000 tons of No. 1 heavy melting steel have now been bought here at $21 a ton delivered, enough in these times to establish the market. This is off $1 a ton for the week. No. 2 steel is also weaker since the downriver mill that had been buying is now out of the market. Low phos sellers are stiffening up a bit, declining to offer it as they did recently at the same price as No. 1 steel. At present there is apparently no market for shoveling turnings here and they are quotable off $1 for the week. This week there is more uncertainty about prices and volume than there has been here for many months, mainly because of declining steel business coupled with the possibility of a steel strike.

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CHICAGO—The $1 decline which took place last week has been expected for some time. Buying at the new prices was not heavy but at least the new orders momentarily cleared away the fog. Turnings and borings remain weak despite the new orders. Railroad scrap, except good cast, slipped a little further. The strength in the cast market reflects heavier buying by the foundries who prefer to use as much cheap scrap as possible instead of high-priced pig. With a minimum of $16.50 differential between the two, it is expected that this practice will continue. The alleged barge movement of black sheet clips to St. Louis has everybody wondering. The tonnage of 2500 net tons each month during June, July and August will be a big cut into the total generated during the months when many plants are on vacation and are working at reduced schedules. The price on barge to Chicago is $2 below what other buyers have recently paid for loose clips here. If the demand for bundles picks up the mills may find the price has suddenly jumped more than they expected it would.

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PHILADELPHIA—There was no strength in this market during the past week. Foundries are on a curtailed basis and mills are not interested in scrap at the present time. However, one mill has been taking small tonnage orders. Some of the dealers in this area will be closed for a 10-day period, since many industrial plants will be closed down for vacations and there will be no scrap collections. Although there is little demand for scrap the trade hopes that the bottom has been reached as far as scrap prices are concerned. Bearish factors are still prevalent and No. 1 heavy melting is off another $1. Machine shop turnings were off another 50¢, otherwise the turning grades remained unchanged. Heavy axle forge turnings and low phos bundles were off $1. being quoted at $17 to $18.

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CLEVELAND—There were no new orders here or in the Valley last week and in view of reduced mill and foundry operations, all factors in the market were bearish. The month of July is expected to be a rough one as scrap producers will continue to operate but consumers are expected to continue out of the market. Brokers will be out of orders by the end of the month. There is no longer any home for dealer scrap and any further dealer purchases will be for stockpiling. Brokers were bidding last week on industrials. Railroad offerings close this week. With the total lack of support in the market, prices of all grades here and in the Valley were down. Melting grades were down by $1 here and by 50¢ and $1 in the Valley. Quoted prices are based on an appraisal of the market.

•

CINCINNATI—Mills were out of the market here last week, and future business was not promising. There is a little foundry business. Brokers are completely out of orders. Some railroads here have cut out their dismantling programs because of the low price of scrap and the high cost of labor. One railroad sold only 1000 to 15000 tons of scrap recently out of a total list of 8000 to 9000 tons. Some foundries have already started their vacation closedowns, with others to follow next week. Heavy melting grades are down by $1 and $2 a ton. Prices quoted are based on an appraisal of the market.

•

DETROIT—The dismal scrap outlook is unchanged here this week and prices are again lower. There is no local buying of any grades. Tonnage awarded in competitive bidding is either being laid down or sent out of town. The tone of the market is definitely on the weak side. Bidding on auto producers' lists this week confirms the downward trend of the market reported in **IRON AGE** during recent weeks. As has been the situation for several months, the market for dealers' scrap is noticeably weaker than the demand for top grade material being generated in huge quantities in the busy auto plants.

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NEW YORK—The market here has slowed up so that there is practically no business to speak of. There is no new business and many consumers will be out of the market during the month of July. Some material has moved during the past week, but at reduced prices. Since the prices have gone down consumers are more selective in accepting the scrap which is being shipped to them. Industrial scrap has also dropped off due to the reduced operations and vacation periods. No. 1 heavy melting steel is being quoted at $11 to $11.50. The cast grades were all down with mixed yard cast and heavy breakable cast off $3 on the high side.

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ST. LOUIS—The market for scrap iron in the St. Louis industrial district continues dull as the steel mills become more cautious in their buying with the possibility of steel and coal strikes hitting them. Receipts are light.

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BOSTON—Inactivity and probably the dullest week yet, is the story here. There is no incoming scrap, to speak of. No. 1 steel is down to $10 to $11, which is its low for the move. The cast iron situation is bad, just as it has been for months.

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BIRMINGHAM—Scrap activity in this area has declined to the point where a car order is considered big business. Vacation periods at pipe shops have cut into an already slight demand for cast and mills are out of the market for open-hearth grades. The Louisville & Nashville R. R. withdrew its list offered the latter part of June and suspended scrap operations temporarily, the trade reports.

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BUFFALO—Gloom was thick this week in the scrap trade as prices sideslipped 50¢ to $3 on sales of a few items and reappraisal of the general market. Cast was knocked down the limit on reports that odd cars of top grade cupola scrap had sold at $23 and $24. Openhearth and blast furnace stuff was clipped 50¢ to $1, with No. 2 heavy melting quoted at $17 to $17.50, although the last reported business was at $18. Small sales of low phos were made at around $20.50 f.o.b. Buffalo for nearby shipment. A 5000-ton shipload of scrap arrived from Duluth and more canal scrap was in transit for local consumption.

UNIVERSITY OF MICHIGAN LIBRARIES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.00
R.R. hvy. melting	21.50 to 22.00
No. 2 hvy. melting	18.50 to 19.00
No. 2 bundles	16.50 to 17.00
R.R. scrap rails	23.00 to 24.00
Rails 2 ft and under	26.50 to 27.50
No. 1 comp'd bundles	20.50 to 21.00
Hand bdld. new shts.	18.50 to 19.00
Hvy. steel forge turn.	17.50 to 18.00
Mach. shop turn.	13.50 to 14.00
Shoveling turn.	16.50 to 17.00
Mixed bor. and ms. turn.	13.50 to 14.00
Cast iron borings	16.50 to 17.00
No. 1 mach. cast.	26.00 to 27.00
Mixed yard cast.	21.50 to 23.50
Hvy. breakable cast.	18.50 to 19.00
Malleable	22.50 to 23.00
RR. knuck. and coup.	24.50 to 25.50
RR. coil springs	24.50 to 25.50
RR. leaf springs	24.50 to 25.50
Rolled steel wheels	24.50 to 25.00
Low phos.	21.50 to 22.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50 to $20.00
No. 2 hvy. melting	17.50 to 18.00
Factory bundles	19.50 to 20.00
No. 1 dealers' bundles	17.00 to 18.00
No. 2 dealers' bundles	15.00 to 16.00
Mach. shop turn.	11.00 to 12.00
Short shov. turn.	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Mix. borings and turn.	9.00 to 10.00
Low phos. hvy. forge	23.00 to 24.00
Low phos. plates	21.00 to 22.00
No. 1 RR. hvy. melt.	21.00 to 21.50
Rerolling rails	27.00 to 28.00
Miscellaneous rails	23.50 to 24.00
Angles and splice bars	24.00 to 25.00
Locomotive tires, cut	26.00 to 27.00
Cut bolster & side frames	23.00 to 24.00
Standard stl. car axles	26.00 to 27.00
No. 3 steel wheels	24.00 to 24.50
Couplers and knuckles	23.00 to 24.00
Rails, 2 ft and under	27.00 to 28.00
Malleable	22.00 to 24.00
No. 1 mach. cast.	29.00 to 30.00
No. 1 agricul. cast.	27.00 to 29.00
Heavy breakable cast.	22.50 to 23.50
RR. grate bars	18.00 to 18.50
Cast iron brake shoes	17.50 to 18.50
Cast iron car wheels	28.00 to 29.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$17.00 to $18.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 bundles	17.00 to 18.00
No. 2 bundles	13.00 to 14.00
Mach. shop turn.	7.00 to 8.00
Shoveling turn.	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Mixed bor. and turn.	7.00 to 8.00
Low phos. 18 in. under	24.00 to 25.00
No. 1 cupola cast.	25.00 to 26.00
Hvy. breakable cast.	17.00 to 18.00
Rails 18 in. and under	29.00 to 30.00
Rails random length	19.00 to 20.00
Drop broken	29.00 to 30.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$10.00 to $11.00
No. 2 hvy. melting	8.00 to 8.50
No. 1 bundles	10.00 to 10.75
No. 2 bundles	8.00 to 9.00
Bushelings	7.50 to 8.00
Shoveling turn.	7.00 to 7.50
Machine shop turn.	3.00 to 3.50
Mixed bor. and turn.	2.50 to 3.00
Cl'n cast chem. bor.	9.00 to 11.00
No. 1 machinery cast.	26.00 to 29.00
No. 2 machinery cast.	18.00 to 21.50
Heavy breakable cast.	16.00 to 17.00
Stove plate	16.00 to 17.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$13.50 to $14.00
No. 2 hvy. melting	11.50 to 12.00
No. 1 bundles	13.50 to 14.00
New busheling	13.50 to 14.00
Flashings	13.50 to 14.00
Mach. shop turn.	7.00 to 8.00
Shoveling turn.	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Mixed bor. and turn.	7.50 to 8.00
Low phos. plate	13.50 to 14.00
Heavy breakable cast.	13.50 to 16.50
Stove plate	16.00 to 17.00
Automotive cast.	21.00 to 23.00
No. 1 cupola cast.	19.50 to 21.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00 to $18.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 bundles	17.00 to 18.00
No. 2 bundles	15.00 to 16.00
Mach. shop turn.	10.50 to 11.50
Shoveling turn.	13.00 to 14.00
Mixed bor. and turn.	10.00 to 10.50
Clean cast chemical bor.	16.00 to 17.00
No. 1 machinery cast.	27.00 to 28.00
No. 1 mixed yard cast.	24.00 to 25.00
Hvy. breakable cast	23.00 to 24.00
Hvy. axle forge turn.	17.00 to 18.00
Low phos. electric furnace	22.00 to 22.50
Low phos. acid openhearth	21.00 to 21.50
Low phos. bundles	17.00 to 18.00
RR. steel wheels	22.00 to 22.50
RR.coil springs	22.00 to 22.50
RR. malleable	23.00 to 24.00
Cast iron carwheels	27.00 to 28.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 2 bundled sheets	15.00 to 16.00
Mach. shop turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Locomotive tires, uncut	18.00 to 19.00
Mis. std. sec. rails	21.00 to 22.00
Steel angle bars	23.00 to 24.00
Rails 3 ft and under	25.00 to 26.00
RR. steel springs	21.00 to 22.00
Steel car axles	25.00 to 26.00
Brake shoes	19.00 to 20.00
Malleable	19.00 to 20.00
Cast iron car wheels	24.00 to 25.00
No. 1 machinery cast.	23.00 to 25.00
Hvy. breakable cast.	19.00 to 20.00
Stove plate	20.00 to 21.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 2 bundles	16.00
No. 1 busheling	18.00
Long turnings	13.00
Shoveling turnings	15.00
Cast iron borings	15.00
Bar crops and plate	22.50
Structural and plate	22.50
No. 1 cupola cast.	26.00
Stove plate	20.00
No. 1 RR. hvy. melt.	$20.00 to 20.50
Steel axles	20.00
Scrap rails	20.00
Rerolling rails	22.50 to 23.00
Angles & splice bars	22.00 to 23.00
Rails 2 ft & under	23.00 to 24.00
Cast iron carwheels	17.00 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00 to $20.50
No. 2 hvy. melting	17.50 to 18.00
No. 1 bundles	20.00 to 20.50
No. 2 bundles	16.00 to 16.50
Mach. shop turn.	10.50 to 11.00
Short shov. turn.	16.50 to 17.00
Cast iron borings	16.50 to 17.00
Low phos.	21.00 to 21.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$11.00 to $11.50
No. 2 hvy. melting	10.00 to 10.50
No. 2 bundles	9.00 to 10.00
Mach. shop turn.	5.25 to 5.75
Mixed bor. turn.	5.25 to 5.75
Shoveling turnings	7.00 to 8.00
Machinery cast.	19.50 to 20.00
Mixed yard cast.	18.00 to 19.00
Heavy breakable cast.	16.00 to 16.50
Charging box cast.	16.00 to 16.50
Unstrp. motor blks.	14.50 to 15.00
Cl'n cast chem. bor.	11.00 to 13.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.00 to $19.50
No. 2 hvy. melting	17.00 to 17.50
No. 1 bundles	17.00 to 17.50
No. 2 bundles	15.00 to 15.50
No. 1 busheling	17.00 to 17.50
Mach. shop turn.	10.50 to 11.00
Shoveling turn.	14.00 to 15.00
Cast iron borings	14.00 to 14.50
Mixed bor. and turn.	14.00 to 14.50
Cupola cast.	22.00 to 23.00
Mixed yard cast.	20.00 to 21.00
Stove plate	20.00 to 21.00
Small indus. malleable	18.00 to 19.00
Low phos. plate	20.00 to 20.50
Scrap rails	23.00 to 24.00
Rails 3 ft & under	30.00 to 31.00
RR. steel wheels	23.00 to 24.00
RR. coil & leaf spgs.	23.00 to 24.00
RR. knuckles & coup.	23.00 to 24.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	15.00 to 15.50
No. 1 bundles	16.50 to 17.00
No. 2 bundles	14.00 to 14.50
No. 1 busheling	16.50 to 17.00
Drop forge flashings	16.50 to 17.00
Mach. shop turn.	9.50 to 10.00
Shoveling turn.	16.00 to 16.50
Steel axle turn.	16.50 to 17.00
Cast iron borings	16.00 to 16.50
Mixed bor. & turn.	16.00 to 16.50
Low phos. 2 ft and under	19.00 to 19.50
No. 1 mach. cast.	26.50 to 27.00
Malleable	20.50 to 21.50
RR. cast.	26.50 to 27.50
Railroad grate bars	19.50 to 20.00
Stove plate	19.50 to 20.00
RR. hvy. melting	19.50 to 20.00
Rails 3 ft and under	26.50 to 27.50
Rails 18 in. and under	27.50 to 28.50

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	28.00
No. 1 cupola cast.	$20.00 to 25.00
RR. hvy. melting	20.00
Rails	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$24.00 to 26.00
RR. hvy. melting	20.00

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$20.00
No. 1 & No. 2 bales	16.00
No. 3 bales	13.00
Elec. fur. 1 ft and under	22.00
No. 1 cupola cast.	$20.00 to 27.00
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast Grades f.o.b. shipping point:

Heavy melting	$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd	21.00*
Bushelings, new fact, unprop'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$48.00 to 50.00
No. 2 cast.	44.00 to 45.00

*Ceiling Price.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type: declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	June 28, 1949	June 21, 1949	May 31, 1949	June 29, 1948
Hot-rolled sheets	3.25	3.25	3.25	2.775
Cold-rolled sheets	4.00	4.00	4.00	3.495
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.913
Hot-rolled strip	3.25	3.25	3.25	2.775
Cold-rolled strip	4.038	4.038	4.038	3.535
Plates	3.40	3.40	3.40	2.93
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.70
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	5.90
Special coated mfg. ternes	6.65	6.65	6.65	5.80
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	2.875
Cold-finished bars	3.995	3.995	3.995	3.483
Alloy bars	3.75	3.75	3.75	3.213
Structural shapes	3.25	3.25	3.25	2.767
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.608
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.725
Light rails	3.55	3.55	3.55	3.05
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.133
Skelp	3.25	3.25	3.25	2.888

Pig Iron: (per gross ton)	June 28, 1949	June 21, 1949	May 31, 1949	June 29, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$44.74
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti*	45.47	45.47	45.47	45.47
No. 2, Birmingham	39.38	39.38	39.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	39.00
Basic del'd Philadelphia*	49.74	49.74	49.74	44.24
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	39.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	65.55
Ferromanganese‡	173.40	173.40	173.40	145.00

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.
*Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)	June 28, 1949	June 21, 1949	May 31, 1949	June 29, 1948
Heavy melt'g steel, P'gh.	*$20.75*	$21.50	$22.75	$40.25
Heavy melt'g steel, Phila.	*17.50*	18.50	21.00	42.50
Heavy melt'g steel, Ch'go	*19.75*	20.75	21.50	39.25
No. 1, hy. comp. sh't, Det.	*13.75*	14.75	16.75	35.50
Low phos. Young'n	*21.25*	22.25	23.75	45.25
No. 1, cast, Pittsburgh	26.50	26.50	27.75	63.75
No. 1, cast, Philadelphia	27.50	27.50	28.00	67.00
No. 1, cast, Chicago	29.50	28.88	27.50	69.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$12.75
Foundry coke, prompt	16.25	16.25	16.25	16.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	16.00	16.00	17.625	21.50
Copper, Lake Conn.	18.625	18.625	18.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	9.00	9.00	11.00	12.00
Lead, St. Louis	11.85	11.85	12.85	17.30
Aluminum, virgin	17.00	17.00	17.00	16.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00

Composite Prices . .

Starting with the issue of May 12, 1949 the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive, see p. 139 of May 12, 1949 issue.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
June 28, 1949	3.705¢ per lb.	$45.91 per gross ton	*$19.33* per gross ton
One week ago	3.705¢ per lb.	$45.91 per gross ton	$20.25 per gross ton
One month ago	3.705¢ per lb.	$45.91 per gross ton	$21.75 per gross ton
One year ago	3.211¢ per lb.	$40.51 per gross ton	$40.66 per gross ton

	HIGH	LOW
1949	3.720¢ Jan. 1	3.705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

	HIGH	LOW
1949	$46.82 Jan. 4	$45.91 May 10
1948	46.91 Oct. 12	39.58 Jan. 6
1947	37.98 Dec. 30	30.14 Jan. 7
1946	30.14 Dec. 10	25.37 Jan. 1
1945	25.37 Oct. 23	23.61 Jan. 2
1944	$23.61	$23.61
1943	23.61	23.61
1942	23.61	23.61
1941	$23.61 Mar. 20	$23.45 Jan. 2
1940	23.45 Dec. 23	22.61 Jan. 2
1939	22.61 Sept. 19	20.61 Sept. 12
1938	23.25 June 21	19.61 July 6
1937	23.25 Mar. 9	20.25 Feb. 16
1936	19.74 Nov. 24	18.73 Aug. 11
1935	18.84 Nov. 5	17.83 May 14
1934	17.90 May 1	16.90 Jan. 27
1933	16.90 Dec. 5	13.56 Jan. 3
1932	14.81 Jan. 5	13.56 Dec. 6
1931	15.90 Jan. 6	14.79 Dec. 15
1929	18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	HIGH	LOW
1949	$43.00 Jan. 1	$19.33 June 28
1948	43.16 July 27	39.75 Mar. 9
1947	42.58 Oct. 28	29.50 May 20
1946	31.17 Dec. 24	19.17 Jan. 1
1945	19.17 Jan. 2	18.92 May 22
1944	19.17 Jan. 11	15.76 Oct. 24
1943	$19.17	$19.17
1942	19.17	19.17
1941	$22.00 Jan. 7	$19.17 Apr. 10
1940	21.83 Dec. 30	16.04 Apr. 9
1939	22.50 Oct. 3	14.08 May 16
1938	15.00 Nov. 22	11.00 June 7
1937	21.92 Mar. 30	12.67 June 9
1936	17.75 Dec. 21	12.67 June 8
1935	13.42 Dec. 10	10.33 Apr. 29
1934	13.00 Mar. 13	9.50 Sept. 25
1933	12.25 Aug. 8	6.75 Jan. 3
1932	8.50 Jan. 12	6.43 July 5
1931	11.33 Jan. 6	8.50 Dec. 29
1929	17.58 Jan. 29	14.08 Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

UNIVERSITY OF MICHIGAN LIBRARIES

Fifty years of service

1899—1949

SCHIAVONE · BONOMO CORP.

FOOT OF JERSEY AVE., JERSEY CITY, N. J., U. S. A. · Cable Address "SCHIABO" NEW YORK

HARRISON, N. J. · NEWARK, N. J. · BROOKLYN, N. Y. · BRONX, N. Y. · STAMFORD, CONN.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Widths up to 12-in. inclusive. (2) 0.25 carbon and less. (3) Cokes, 1.25 lb, deduct 25¢ per base box. (4) 18 gage and heavier. (5) For straight length material only from producers to fabricators. (6) Also shafting. For quantities of 40,000 lb and over. (7) Carload lot in manufacturing trade. (8) Hollowware enameling, gages 29 to 31 only. (9) Produced to dimensional tolerances in AISI Manual Sec. 6. (10) Slab prices subject to negotiation in most cases. (11) San Francisco only. (12) Los Angeles only. (13) San Francisco and Los Angeles only. (14) Seattle only. (15) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00											$50.00			
Alloy	$51.00						(per net ton)					$51.00			
BILLETS, BLOOMS, SLABS Carbon, rerolling[10]	$52.00				$52.00	$52.00	(per net ton)						$52.00		$71.00
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)					$61.00	$61.00		$80.00
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)					$63.00			$82.00
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[11] 4.20[12]	
SHEETS Hot-rolled[4]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken, Pa. 3.35)	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95[13]	4.15
Cold-rolled	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	4.90
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4 40			5.15[13]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[1]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.40
Cold-rolled[2]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.25			4.90
TINPLATE Cokes, 1.50 lb.[3] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. = $8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[8]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05	4.00
Reinforcing[5]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[6]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon = 3.75				4.05	3.75	4.80[12]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon = 4.65			Worcester 4.95				
PLATE Carbon steel[9]	3.40	3.40	3.40	3.40	3.40 Conshohocken = 3.50	3.40	3.40	3.40 Coatesville = 3.50, Claymont = 3.50 Geneva = 3.40, Harrisburg = 3.50				3 65	3.40	4.30[14]	4.00
Floor plates	4.55	4.55		4.55				Conshohocken = 4.55							
Alloy	4.40	4.40							Coatesville = 4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem = 3.30, Geneva, Utah = 3.25						3.30	3.60 to 3.90[14]	3.80
MANUFACTURERS' WIRE[7] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth = 4.15, Worcester = 4.45				4.15	5.15[11]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel							Straight Chromium		
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.80	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢
†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless clad		
No. 304, 20 pct, f.o.b. Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	
Aluminized steel sheets		
Hot dip, f.o.b. Butler, Pa.		7.75

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	*Pittsburg, Calif.*
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	*Pittsburg, Calif.*
Annealed fence wire†	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic Sharon*	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Sharon*
Plates	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.45
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.30
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

* Sheets and strip.

UNIVERSITY OF MICHIGAN LIBRARIES

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, about $200.00 per net ton.

STANDARD, THREADED AND COUPLED

	Black*	Galv.
Steel, buttweld		
½-in.	43 to 41	26½ to 24½
¾-in.	46 to 44	30½ to 28½
1-in.	48½ to 46½	33½ to 31½
1¼-in.	49 to 47	34 to 32
1½-in.	49½ to 47½	34½ to 32½
2-in.	50 to 48	35 to 33
2½ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½ to 27	23 to 11½
2½ to 3-in.	41½ to 32½	26 to 17
3½ to 6-in.	43½ to 38½	28 to 23
Wrought Iron, buttweld		
½-in.	+20½	+47
¾-in.	+10½	+36
1 & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	27 to 25
¾-in.	46 to 44	31 to 29
1-in.	48 to 46	34 to 32
1¼-in.	48½ to 46½	34½ to 32½
1½-in.	49 to 47	35 to 33
2-in.	49½ to 47½	35½ to 34½
2½ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½ to 32½	23 to 18
2½ to 3-in.	41½ to 36½	27 to 23
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
½-in.	+16	+40
¾-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.

*Fontana, Calif., deduct 11 points from figures in left column.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in In.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $95.70
6 to 24-in., del'd N. Y. ..... $92.50 to 97.40
6 to 24-in., Birmingham 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 109.30

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	27.00¢
Antimony	53.73¢
Brass, 10 ton lots	20.50 to 23.50¢
Copper, electrolytic	26.125¢
Copper, reduced	26.00¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	20.22¢
Manganese	48.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.15 to $1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	11.75 to 16.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅜-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢: Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*), add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.00	....	6.40	5.00		5.15	5.00	5.10	6.57	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.42-7.57	5.24	7.27	5.35	5.00	4.95-	5.40	9.30-	9.60-	10.65	10.95-
Chicago	4.85	5.75	6.95-7.10	4.85	5.55-6.68	5.10	4.90	4.90	5.70	8.90	9.26	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.85-5.16	5.75-6.06	6.15-7.46	5.03-5.15	....	5.21-5.54	5.01-5.47	5.01-5.34	5.70-5.97	9.49-9.50	9.74-9.75	10.95	11.19-11.20
Detroit	5.28-5.32	6.07-6.18	7.38-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.10	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6 14	11.25	11.39	....	....
Los Angeles	6.45	7.80[19]-7.90[1]	8.05	6.65	8.35[5]	6.15	5.95	6.10	7.95[14]	10.95[15]	10.90[15]-14.70	12.45[15]	12.70[15]-16.45
Memphis	5.75-5.80	6.60	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.13-7.18	5.03-5.38	6.86	5.28	5.08	5.08	5.88	9.53	9.78	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31-6.46	6.90-7.00	5.62-5.72	....	5.70	5.33	5.57	6.36-6.41	9.28-9.73	9.58-9.98	11.18	11.43
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.08	6.24[13]	6.73	5.45	6.69	5.38	5.10	5.40	6.19	9.70	9.75	10.95	11.20
Pittsburgh	4.85	5.75[1]	6.90	5.00	6.00	5.05	4.90	4.90	5.65	8.90	9.20	10.25	10.55
Portland	6.50[8]-6.90	8.00[1]	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.25[3]	8.20	8.80-9.30	7.65[3]	....	6.10[3]	5.70[3]	6.95[8]	8.30	....	....	....	....
San Francisco	6.15[8]-7.15	7.50[2]	7.90	6.75[8]	8.25[5]	6.30-6.35[8]	5.90[6]	5.90[8]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12[1]-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	6.07-6.22	9.27-9.72	9.57-9.97	10.62-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.29	9.49	9.79	10.84	11.14

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1499 lb strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	....	....	....	....
Birmingham	38.88	39.38	....	....	....
Buffalo	46.00	46.50	47.00	....	....
Chicago	46.00	46.50	46.50	47.00	..
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	....
Erie	46.00	46.50	46.50	47.00	....
Everett	....	50.00	50.50	....	....
Granite City	47.90	48.40	48.90	....	....
Ironton, Utah	46.00	46.50	....	....	....
Lone Star, Texas	46.00	46.50†	....	....	....
Neville Island	46.00	46.50	46.50	....	....
Geneva, Utah	46.00	46.50	....	....	....
Sharpsville	46.00	46.50	46.50	47.00	....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	....
Swedeland	48.00	48.50	49.00	49.50	....
Toledo	46.00	46.50	46.50	47.00	....
Troy, N. Y.	48.00	48.50	49.00	....	54.00
Youngstown	46.00	46.50	46.50	....	....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	50.00	50.50	....	....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	....	....	....
Jersey City	Steelton	3.67	....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13	63.63	....	....	....
Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	....	....	....	....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13-	53.63-	....	....	....
Seattle	Geneva-Ironton	7.13	53.13-	53.63-	....	....	....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	....	....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†			

† Low Phos., Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, $80.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	18.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.

(65-72% Cr, 2% max. Si)	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.50
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

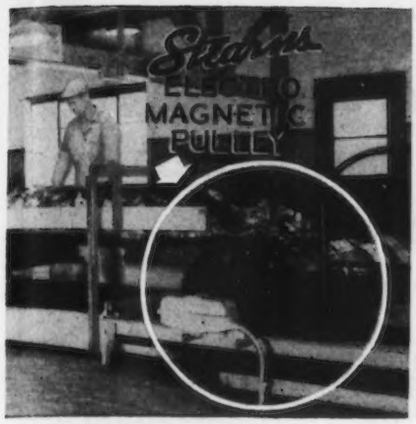
Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N.Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk	11.00¢
Ton lots, packed	11.25¢
Less ton lots	11.75¢

Boron Agents

Contract prices per lb. of alloy, del.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$6.25



Protect

YOUR MACHINERY with a STEARNS MAGNETIC PULLEY!

Metallic refuse can cause costly repairs and possible shut-downs but at the American Crystal Sugar plant in Moorhead, Minn., a Link-Belt installation, this Stearns Electro-Magnetic Pulley helps guard against trouble.

If you want automatic low-cost protection against tramp iron hazards, consult *Stearns Magnetic* — our engineers have the know-how and experience to solve your problem.

Years of research and development by Stearns engineers have produced an outstanding product in magnetic pulleys — the reason for their wide acceptance in all industries for removing tramp iron, for separation and reclamation of materials.

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Management, Labor Appointed to New Health Committee

Washington

• • • **Ten representatives** of industry and labor have been appointed to serve on a new national health committee, the U. S. Public Health Service announced recently.

USPHS said the new organization would bring together for the first time the viewpoints of management, labor, and the health professions on such problems as company-union welfare plans and industrial air pollution.

Dr. W. Palmer Dearing, Acting U. S. Surgeon General, said the first meeting of the new group would probably be held during the last week of September.

The members, all of whom will serve for 1 year, are: Andrew Fletcher, president, St. Joseph Lead Co.; Vincent P. Ahearn, National Sand & Gravel Assn.; Nelson H. Cruikshank, AFL; Harry Read, CIO; Theodore F. Hatch, Industrial Hygiene Foundation; Dr. R. H. Hutcheson, Tennessee Commissioner of Public Health; Harold A. Vonachen, medical director, Caterpillar Tractor Co.; Dr. Leo Price, International Ladies Garment Workers Union, and Mrs. Margaret Lucal, American Assn. of Industrial Nurses.

Passes Strip Mine Bill

Cleveland

• • • **A new strip mine** control bill was passed recently without opposition by the state Senate. The bill is substantially the same as the House bill passed last month.

The provisions of the measure require operators who strip mine 250 tons of coal a year to take out a $50 license, plus $10 extra per acre for estimated workings during the year.

Bonds of $190 an acre must be posted, which is refundable under the following conditions: Spoil banks must be graded to gently rolling surfaces; dams must be built to make ponds in final cuts; fire lanes and access roads must be constructed; and trees, shrubs and grass must be planted.

Violations constitute cause for license revocation and fine.

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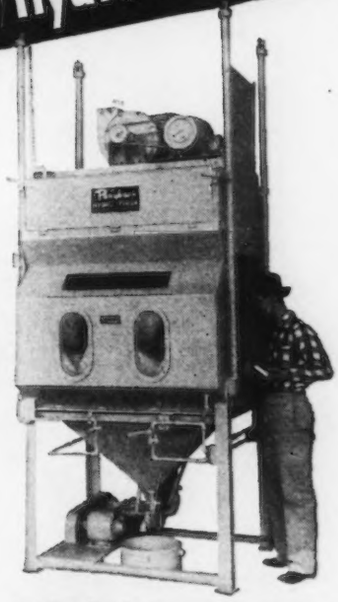

Better Products—with *Hydro-Finish* on your production line, surfaces hold electro-plating better, resist peeling and chipping. Hydro-Finish forms a "tooth" for better bonding of rubber, paint, plastics, etc. Makes threaded pieces turn easily . . . forms little oil pockets in lubricated pieces for longer wear. Eliminates burrs in machined parts and removes or blends grinding lines to reduce fatigue failure!

Longer Tool and Die Life—jobs that formerly took hours are done *in minutes* with *Hydro-Finish!* You clean and improve surface of plastic and die casting dies, rubber and glass molds, forging dies, forming and deep drawing dies, without excessive metal removal. Dies are clean, produce maximum production . . . all without expensive hand maintenance!

GET THE FACTS! Write today for Bulletin 1400 and learn how Hydro-Finish can help you! Address: PANGBORN CORPORATION, 1201 Pangborn Blvd., Hagerstown, Md.

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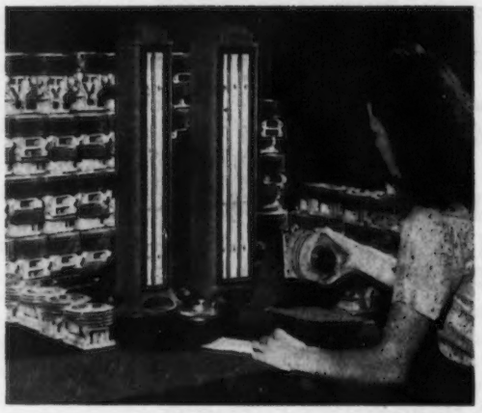
Does your budget prevent your Common Sense from saying YES?



Inspecting cylinder bores at Van der Horst Corp. with Federal Air Gage.

Budgets are necessary guides for routine departmental expense. But, routine methods are not always the most economical, and if there is a better way to do the job—*at less cost*—you can beat the budget.

Some executives have an old-fashioned idea that gaging is a non-productive or overhead cost. Proper gaging, properly tied into production, not only *pays for itself*—it actually pays some of the cost of production. Facts prove that a carefully selected Indicating or Visual type of gage shows the workman *how he is doing*, keeps his production in dimensional control, and prevents waste in scrap, machine time, and manhours. Remember, you *cannot* sell scrap at a profit or get back lost time.

Van der Horst Corp. of America (Olean, New York) cut out one inspection, reduced scrap, and eliminated operator fatigue by gaging with the Federal Air Gage right at production. They now inspect 250 aluminum cylinder bores per hour—66% more than previous rate—checking simultaneously at three places for diameter and out-of-round. It won't obligate you to consult us about similar cost-cutting gages and procedures for your own plant—you may find a way to beat the budget. Write Gaging Headquarters — Federal Products Corp., 1108F Eddy St., Providence 1, R. I.

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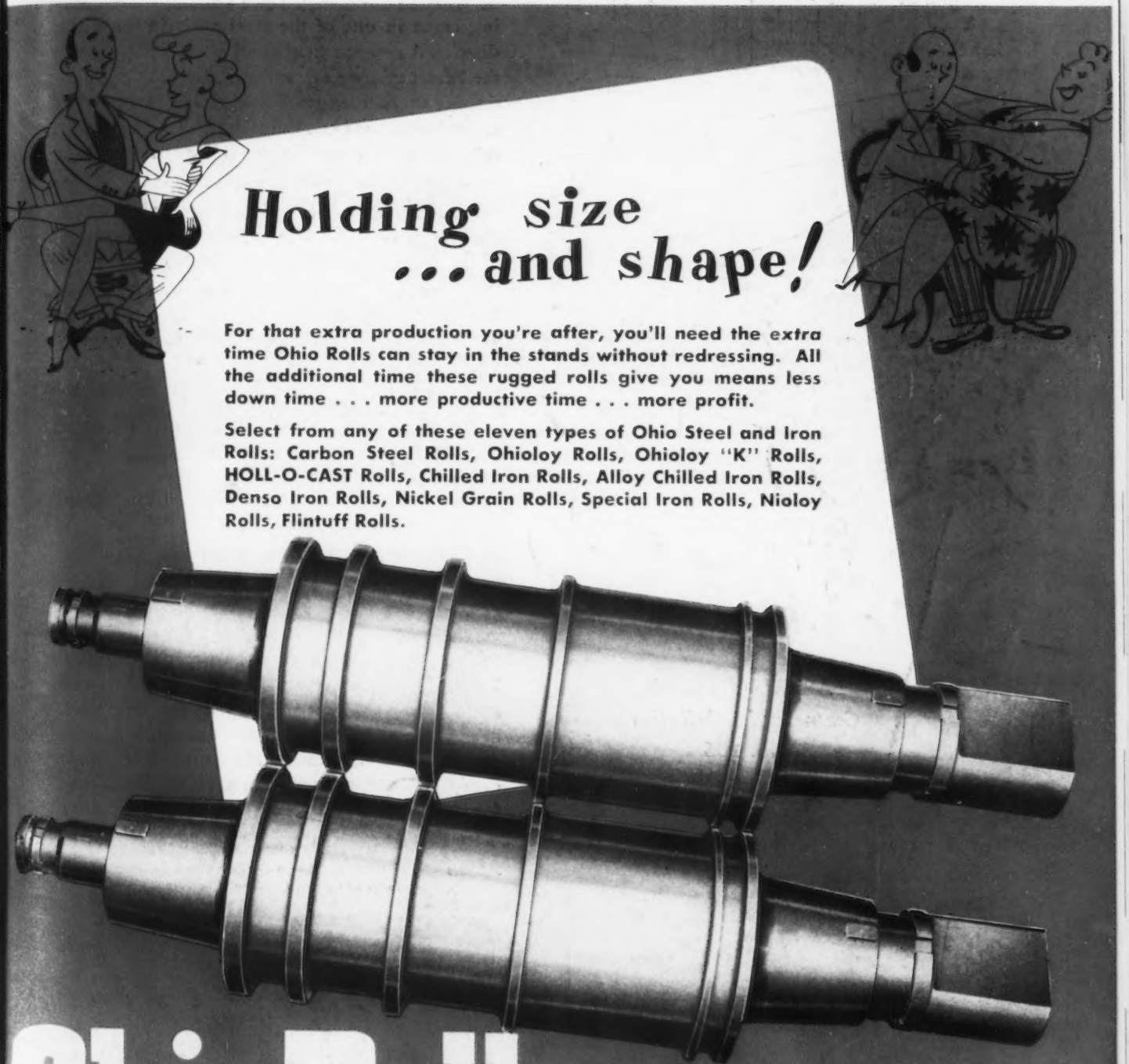
JUN 30 1949

The IRON AGE

JUNE 30, 1949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... and shape!
For that extra production you're after, you'll need the extra time Ohio Rolls can stay in the stands without redressing. All the additional time these rugged rolls give you means less down time . . . more productive time . . . more profit.
Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, HOLL-O-CAST Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Denso Iron Rolls, Nickel Grain Rolls, Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.
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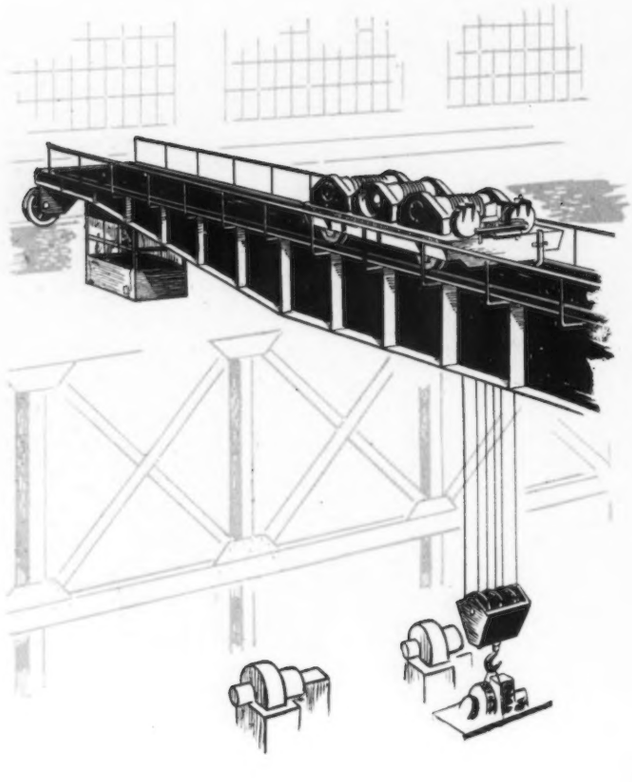


FARVAL—*Studies in Centralized Lubrication* No. 106

NINETEEN years ago, Farval Centralized Lubrication was installed on a 10-ton overhead traveling crane in one of the steel mills in the Chicago district. A recent report on this early job states that the Farval systems are still in service, as good as on the day they were installed, and that since 1930 the crane has never been down for a bearing repair or replacement. In short, there has never been a minute's trouble due to faulty lubrication.

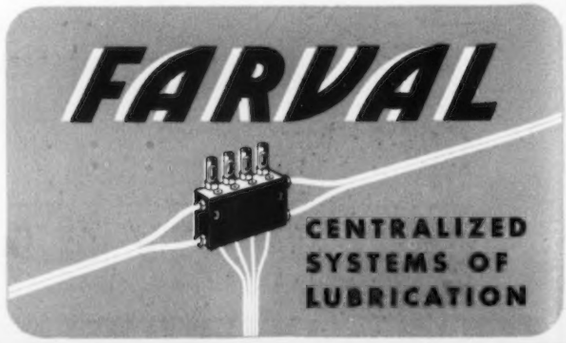
Two manually-operated Farval systems—one on the bridge and one on the trolley—serve 56 points of lubrication including the wheel bearings. In less than five minutes, every eight hours, the operator lubricates every bearing on the crane from two conveniently located hand pumps. No need to climb all over the crane and never a bearing is skipped. Grease consumption is greatly reduced because there is no waste, and drippage is practically eliminated.

More than 2000 Farval systems have been installed on cranes. Many of them are roller bearing cranes, where clean grease is essential and overlubrication should be avoided.

Farval has proven itself in over 20 years of service. It is the original Dualine system of centralized lubrication that others imitate. The Farval valve has only 2 moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its wide valve ports and full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned. For a full description, write for Bulletin No. 25.

The Farval Corp., 3252 E. 80th St., Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



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WIRE ... *for so many uses*

We make steel for so many different uses that the wire you need is probably a grade and quality we have furnished recently. Bethanized wire, bright wire, black annealed wire. Open-hearth steel, Bessemer steel. Low carbon, high carbon, and alloy analyses. Soft wire or hard, stiff or ductile. Wire for coiled upholstery springs, cold-headed products, for welding rod, chains, rope, screws, bolts, hairpins, buckles, handles, nutcrackers, steel wool.

Perhaps you're trying to cut down your costs, improve wire performance, or develop new products. Whatever your plans may be, our technical men are ready to contribute their experience, to work with you in achieving the best possible results.

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Perfect Oil Seals cost very little . . . in fact, their cost is insignificant in comparison with the cost of bearing replacement and lost productive time of the machine. The many other benefits from using Perfect Oil Seals are enumerated at the right. Now more than ever before, the cost conscious designer and user of machinery cannot afford to overlook them.

There are 14 types and 1800 sizes of Perfect Oil Seals from which to choose—a type and size to meet any need.

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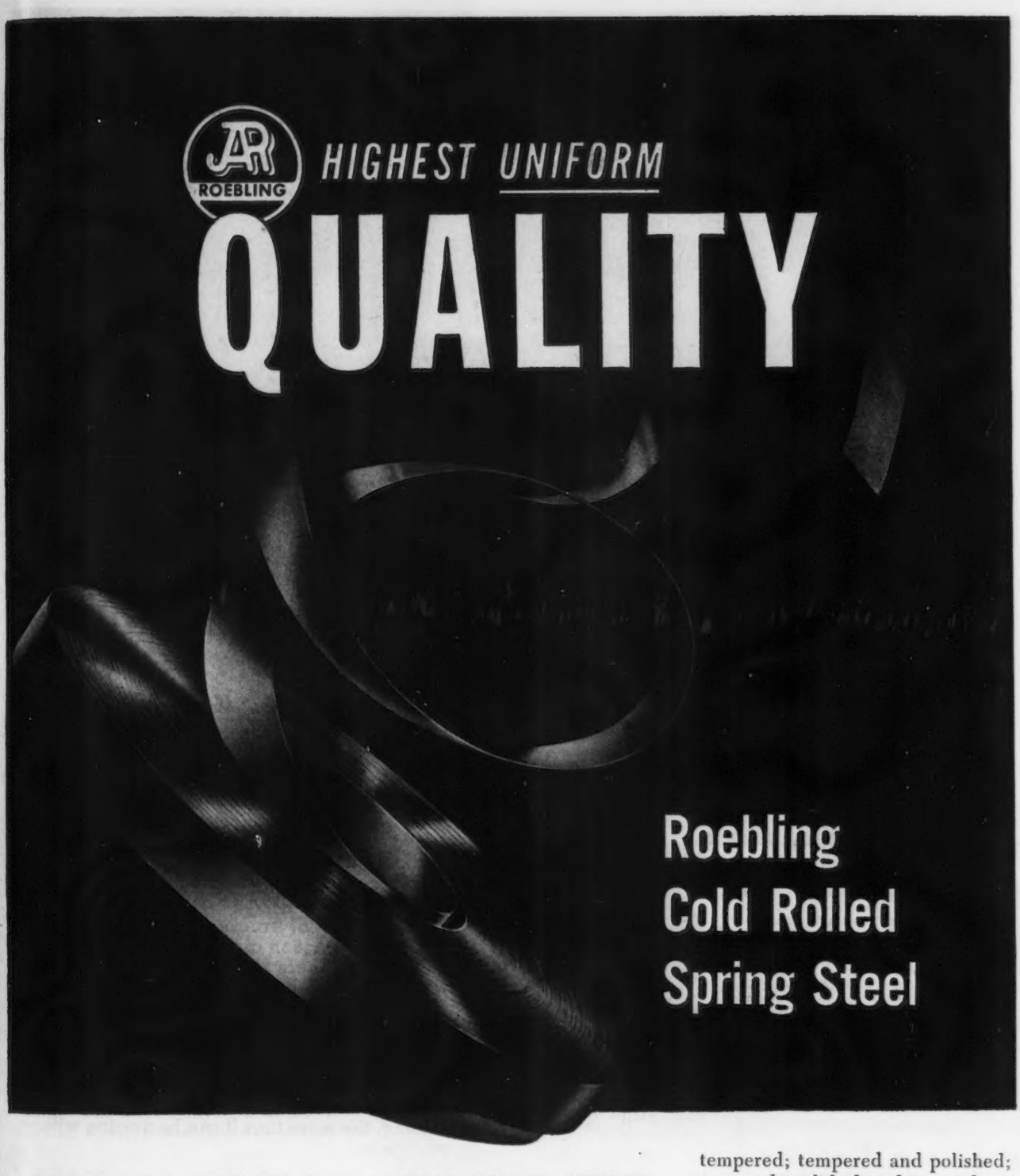

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With higher than 0.25% carbon content, Roebling Cold Rolled Spring Steel can be furnished annealed and hard rolled untempered in bright finish. In the higher carbons in this range, it can be furnished tempered, in scaleless tempered; tempered and polished; tempered, polished and strawed; or tempered, polished and blued.

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(Top) Unloading 2-ton packs of steel sheets with a Cleveland Tramrail Model A Chain Hoist and hand-operated sheet lifter. The loading dock rail extension is a part of an extensive plant-wide Cleveland Tramrail system.

(Above picture) One man easily loads long, heavy boxes onto the truck with this hand-propelled crane and electric hoist.

(Right) Materials are taken directly from truck to fabricating department or vice versa with this Cleveland Tramrail system. For handling small numbers of sheets the inexpensive sling-type sheet grab is satisfactory.

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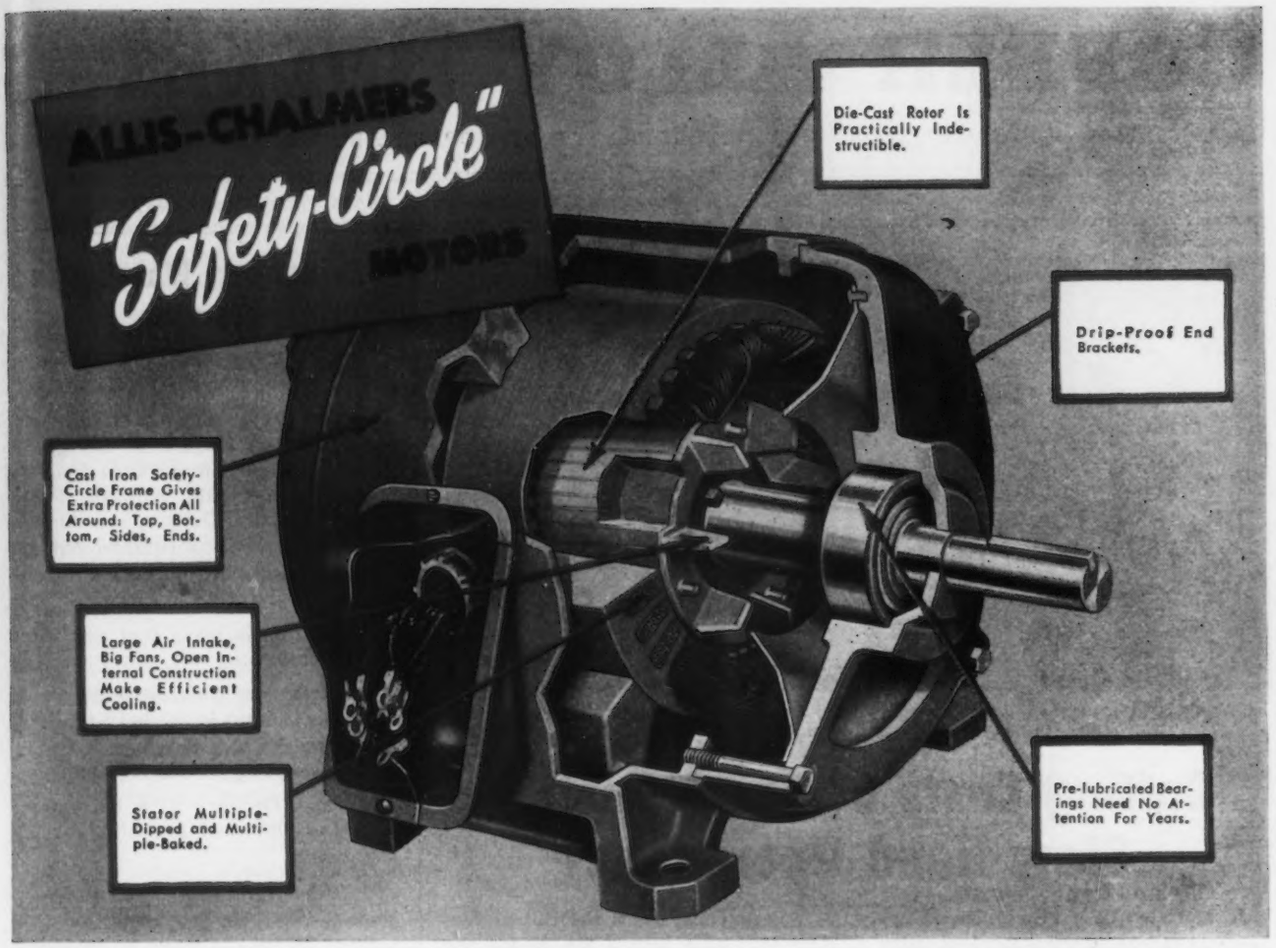
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Means Motor Dependability

EXTRA PROTECTION means extra dependability. That's why Allis-Chalmers protects the working parts of the motor with the exclusive SAFETY-CIRCLE. Compare this motor with motors of less rigid construction. The SAFETY-CIRCLE motor will not distort in mounting or under strain. And you get the extra protection of drip-proof end brackets at no premium.

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Stator is multiple-dipped and multiple-baked in special insulating varnish. Rotor is die-cast aluminum. Stator is mounted in four longitudinal ribs which leaves plenty of air space between stator and frame. Large fans cast integrally with the rotor and ample air intakes keep temperatures well within rated limits. *Ball bearings are factory-lubricated and require no further attention for years.*

When you shop for motors, remember SAFETY-CIRCLE gives you *extra protection, extra dependability* and *lower operating costs.*

For details on SAFETY-CIRCLE advantages, see your A-C Authorized Dealer or Sales Office or write for Bulletin 51B6210B. Sizes 1 to 20 hp, 326 frames and smaller. *Safety-Circle, Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

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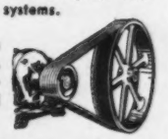

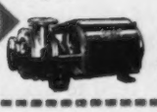

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COPPER ALLOY BULLETIN

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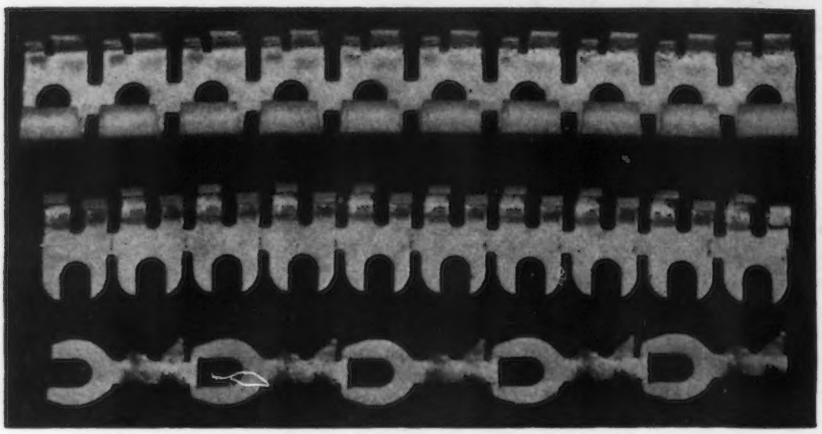
Prepared Each Month by BRIDGEPORT BRASS COMPANY "Bridgeport" Headquarters for BRASS, BRONZE and COPPER



Self-soldering tandem terminals are attached by machine which contains heating unit. Courtesy Patton-MacGuyer Co., Providence, R. I.

Cutting Costs by Mechanizing Slow Hand Operations

Elimination of expensive hand operations is one of the important ways open to fabricators for substantially cutting costs.

This is always a challenge to the ingenuity of machine and product designers to develop methods for changing old-time hand operations to semi or completely automatic cycles. This may involve both the development of a special-purpose machine and the redesign of the product itself.

Cutting High-Cost Soldering

The method for soldering copper terminals to insulated wires is an example of such cost-cutting. Originally the terminals were handled individually and required fluxing, tinning, bending and soldering with either an open flame or soldering iron.

The mechanization of this job involved the development of a machine to do the job automatically, with the exception of inserting the wires. It also required redesigning the terminals in strip form.

Progressive dies were made to blank, pierce and bend the terminals but not clip them off. This permitted tinning and depositing the solder on a mass production basis. The fact that the terminals remain joined until fed into the machine does away with the troublesome problem of hand feeding individual terminals which tend to tangle up.

The machine feeds the roll of tandem terminals into a die. When the wire is inserted and the lever tripped, the die closes, cutting off a single terminal, bending the locking lugs around the wire and simultaneously applying heat to melt the solder. Instead of a few hundred by hand, the machine is capable of producing 1200 or more assemblies per hour.

Copper-Base Alloys Can Help Cut Fabricating Costs

Copper, with its high electrical conductivity, is eminently suited for this job. It can be blanked, formed and clipped with minimum power.

It is extremely ductile which permits the cold bending of locking lugs around the wire without breaking. Copper's high heat conductivity makes it possible to heat the terminal speedily, and dissipate the heat rapidly when the current is shut off.

Product designers interested in cutting production costs will appreciate the fine workability and versatility of the copper-base alloys. Much valuable information on the characteristics of copper, brass, tin, bronze, silicon bronze and aluminum bronze can be gleaned from Bridgeport's Technical Handbook. Contact our nearest Bridgeport sales office for technical help on your metal problems.

Bridgeport Warehouse Service

Are you making adequate use of Bridgeport Warehouse Service?

Large stocks of brass and copper mill products carried in Bridgeport warehouses at Chicago, Cleveland, St. Louis, Minneapolis, Newark, Providence, Houston, Denver, Los Angeles and San Francisco complement the mills at Bridgeport, Conn., and Indianapolis.

Here are six ways that our warehouse service can help you:

1. *Emergency Shortages*—Whenever additional metal is needed to finish a job it can be picked up quickly without interrupting production.

2. *Rush Orders* — Use warehouse stocks as a fill-in while waiting for mill shipments.

3. *Short Runs*—Metal should be obtained from warehouses instead of waiting for mill to make up small lots to order.

4. *New Products and Trial Runs* — Buy as much or as little as you require until experimental stage is completed.

5. *Slitting Service* — Should be used for converting any stock you may have on your shelves to usable widths. This also makes Bridgeport warehouse stocks more flexible.

6. *Cautious Buying* — Warehouse stocks should be used for hand-to-mouth purchasing.

Warehouse Stocklist Available

Bridgeport's Warehouse Stocklist will be mailed upon request. This booklet also contains a valuable technical digest on the properties of most commonly used copper-base alloys. Write to nearest Bridgeport Office for your copy.

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CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

Limitations of Cathodic Protection

Indiscriminate application of cathodic protection cannot be made without carefully studying the whole problem. For example, in sea water the accumulation of alkaline materials at the cathode surface may result in an increase in pH value. A relatively strong alkaline solution accumulating on the surface of lead, zinc, and aluminum (amphoteric metals) will lead to greatly *increased* corrosion rather than decreased corrosion, since these metals are very soluble in alkalies. However, these alkalies scarcely attack steel and copper alloys.

The bond between coal tar, asphalt and other types of coatings applied to metals for protection may be destroyed by the alkalies developed by the action of the current on the salt solution.

Objectionable heat insulating calcium-magnesium-hydroxy-carbonate scales may form on the surfaces of copper and copper alloy heat exchanger tubes in sea water where cathodic protection is applied.

Local shielding of the surface by some object such as a deposit of sludge, cinders, baffle plate, etc., will interrupt cathodic protection. Such shielding prevents the impressed current from reaching the covered spot and allows the formation of a strong local anodic area, which undergoes rapid corrosion.

Increased flow of water over the cathodic surface will lead to a loss of protection, since the alkaline materials, etc., collecting on the cathodic surface are carried away. When such a change occurs, it is necessary to increase the magnitude of the current originally set up in order to offset this effect.

Breaks in the continuity of the electrical circuit leads to deep, local corrosion where the current leaves one section of the metal structure in the circuit on its way to some other point. It is necessary to tie into the electrical circuit all parts of the equipment to be protected. Obviously, cathodic protection should be cautiously applied and carefully designed.

For references and a discussion of the fundamentals and application of cathodic protection see: H. H. Uhlig, "Corrosion Handbook", pp. 923-950, John Wiley & Sons, Inc., 1948.

Did You Know...

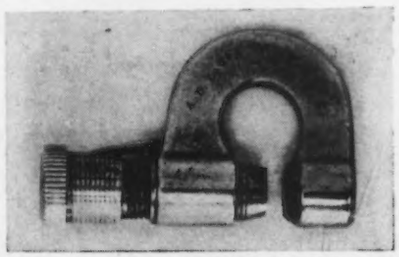
Bridgeport Brass Developed First Mike?

It was 1867, two years after Bridgeport Brass was founded. The Union Metallic Cartridge Company (now Remington Arms) had returned a quantity of brass because it was "out of gauge".

S. R. Wilmot, superintendent, applied his "finger" gauge on several rolls and stoutly denied the charge. However, the customer's gauge did not agree with Mr. Wilmot's, or with a third.

Mr. Wilmot then took matters into his own hands and called in Mr. Laws, of the Mechanical Department. He demanded a gauge with a calibrated moving part that would measure thicknesses accurately.

Meeting emergencies was nothing new to Bridgeport Brass and soon the first "mike" was born. Mr. Laws made five more to fulfill requests from most important customers, but when more were called for, he rebelled. The firm of Joseph R. Brown and Lucian Sharpe was asked to take this task off his hands.



Granddaddy of the micrometer caliper—designed and made by Bridgeport Brass in 1867.

With some minor modifications in the method of reading, the micrometer caliper of today is essentially the same as the one which Bridgeport developed for its own use in 1867.

Industry is indebted to Bridgeport Brass for this universal instrument of precision.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items have been tested or are endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

New Plating Rack Coating, 100% solids, is said to give a sound coating in only two dips. Provides good protection and insulation to rack in all types of electroplating and anodizing solutions, it is claimed. **No. 948**

Wire Stripping Tool is reported to grip, cut and strip insulation in one operation, with no possibility of nicking or cutting wire or fraying wire ends. **No. 949**

Coil Straightening Machine has a coil capacity of 6000 pounds of strip up to 36 inches wide. Variable speeds from 225 to 900 feet per minute. **No. 950**

Quick-Drying Metal Primer is said to make it possible to apply two coats of paint over metal in a single day. Dries to touch in 10 minutes, can be handled in 20, and may be painted over in 30 minutes to an hour. **No. 951**

Steel Strap Selector is said to help in the proper selection of length and weight of strap required for any given binding or packaging operation. Also helps in selection of material best suited to conditions to which strapping will be exposed. **No. 952**

Abrasive Compounds made with water soluble base are offered in three different grades especially suitable for use in grinding and lapping-in brass or bronze tapered plug or key cock valves. **No. 953**

New Adapter converts any ¼" drill into a compact, efficient power hammer suitable for use for moderately heavy hammering. May be operated in drill press and delivers one blow per revolution. **No. 954**

Improved Keyway Push Broach is said to require no guide since it supports itself in hole. Only one pass is required to complete standard depth. Available in keyway widths from 1/32 to 1/4" for any desired hole diameter. **No. 955**

Two-Tone Lacquer Finish can be produced with one coat of new material, it is claimed, at lower cost than for two coat methods. Ready to apply by spraying, it air drys hard in 20 minutes, simulating hammered finish in two colors. **No. 956**

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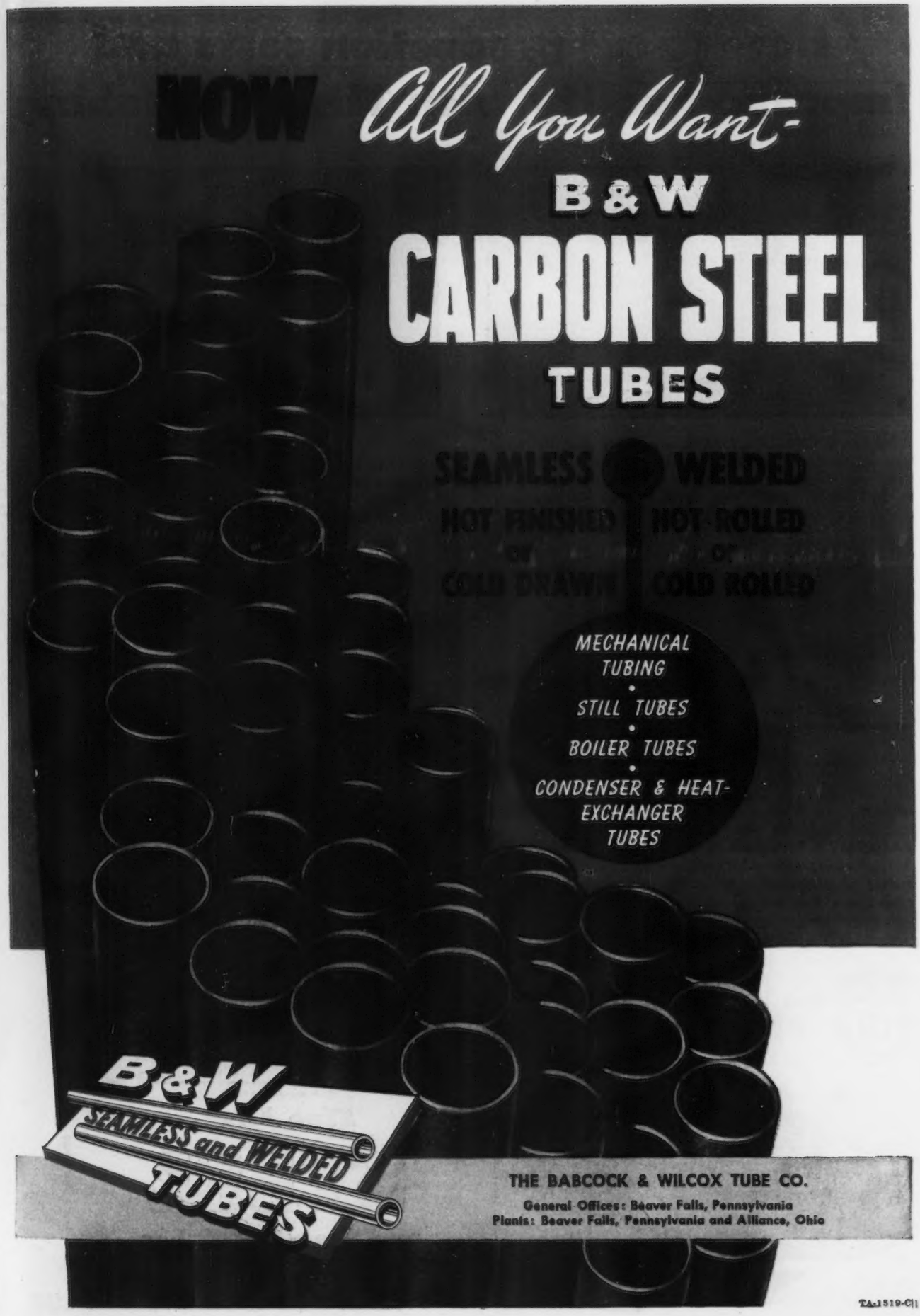
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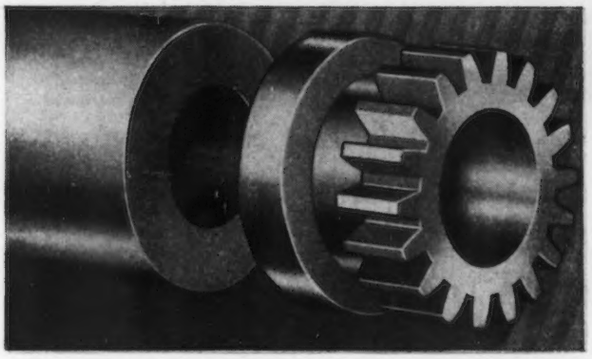
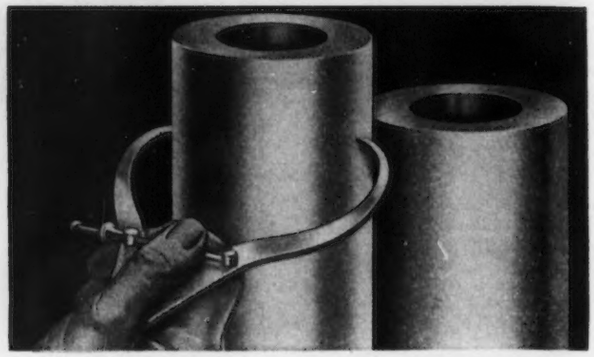
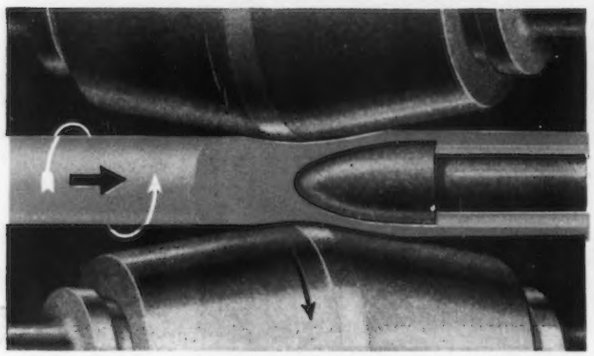
How to cut production costs and improve quality with TIMKEN® tubing



YOU SAVE MATERIAL COSTS, machining time, and boost production when you make cylindrical parts from Timken® seamless tubing instead of bar stock. There's no center hole to drill ... less stock to machine. Boring is eliminated or reduced to a rapid finishing operation.



OUR TUBE ENGINEERING SERVICE makes possible even greater savings, because it will select the most economical tube for your job—guaranteed to clean up to your finished dimensions. This service has proved so valuable to parts makers that 90% of Timken seamless tubing is now bought on this basis.



BASICALLY A FORGING OPERATION! In the piercing of Timken tubing, red hot billets are worked between the rolls with a spiral, kneading action that gives a uniform spiral grain flow and refined grain structure. The result is uniform, fine forged quality from one end to the other in every tube.

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2. **MACHINING**—Is part held on O.D. or I.D. during the initial machining operation? Complete sequence of operations when practical.
3. **FINISH OF TUBING DESIRED**—Hot Rolled, Cold Drawn, Rough Turned, Roto-rolled or Centerless Ground.
4. **CHEMICAL ANALYSIS AND OTHER SPECIFICATIONS.**

FOR AN ANALYSIS OF YOUR REQUIREMENTS, send the data indicated above. No cost or obligation. And ask for our informative booklet, "Facilities and Products". The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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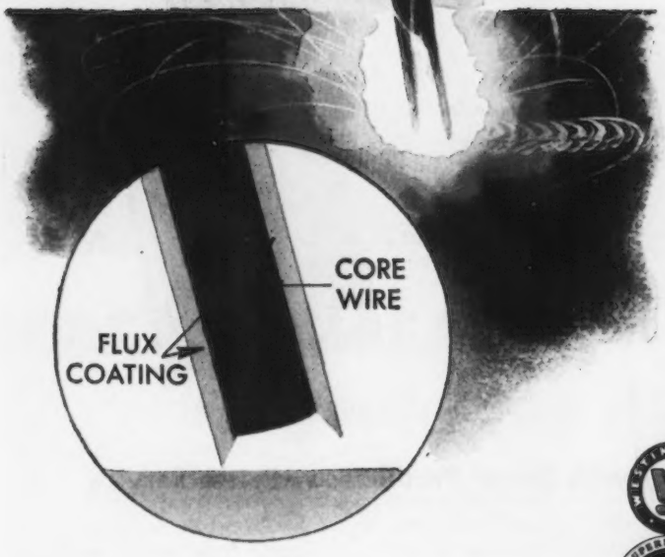

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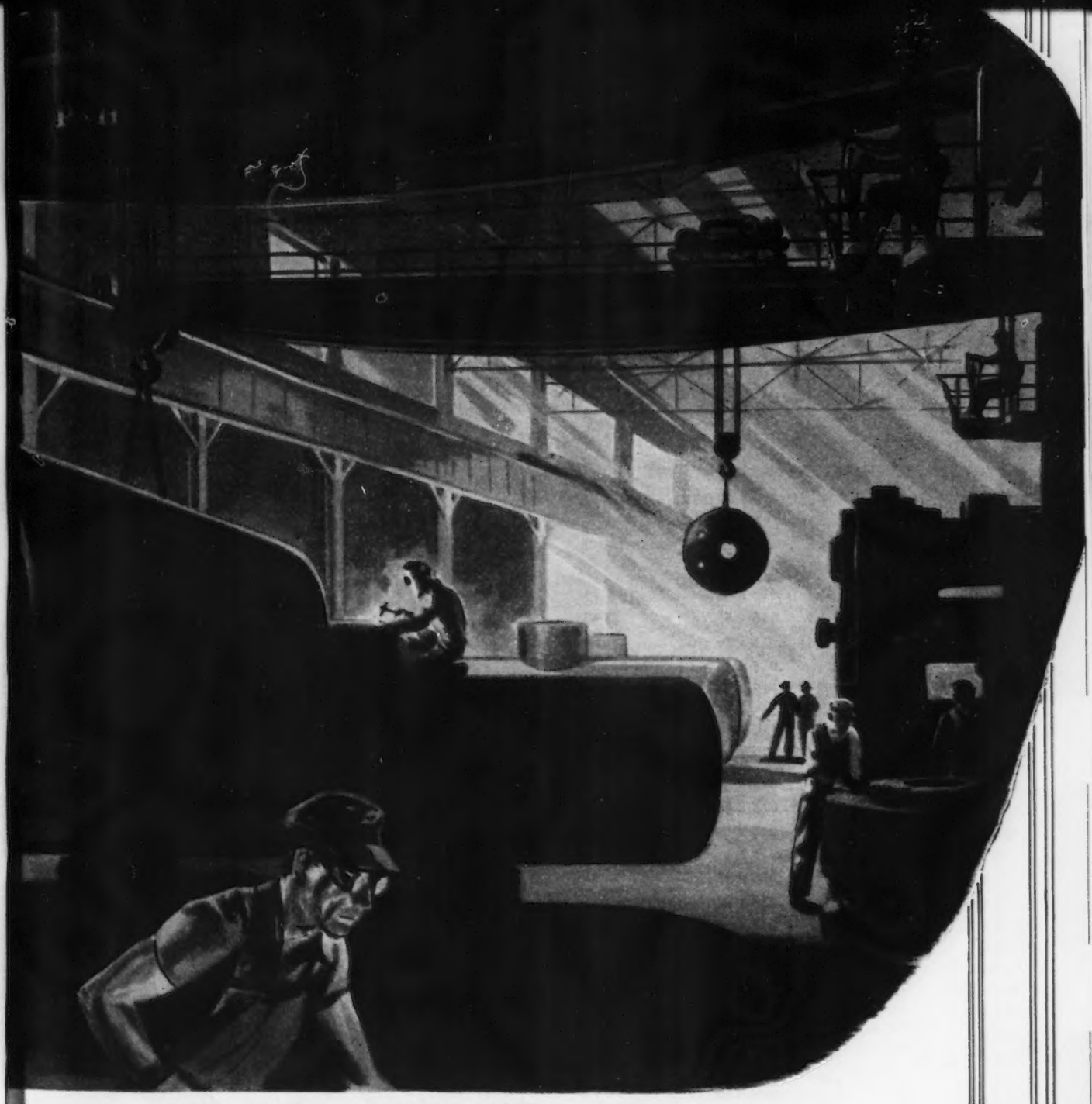

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This steel will positively not be sold to any government or manufacturer for possible use against the United States.

SIZE	LBS. IN STOCK	SIZE	LBS. IN STOCK
.005 x 5/16	115	.015 x ½	788
.005 x ½	98	.015 x ⅝	541
.005 x 4	146	.015 x ¾	439
.006 x ⅜	294	.015 x ⅞	844
.006 x 1¾	311	.015 x 1	945
.006 x 2	715	.015 x 1½	192
.006 x 2½	514	.015 x 2	1188
.006 x 6	418	.015 x 3¼	394
.007 x ¾	81	.015 x 6	597
.007 x 2	246	.018 x ½	680
.008 x 1½	102	.018 x ⅝	232
.009 x 1	156	.018 x ¾	499
.010 x 5/16	96	.018 x 1	138
.010 x ⅜	100	.018 x 1½	157
.010 x ½	109	.018 x 2	274
.010 x ⅞	108	.018 x 3	114
.010 x 1	459	.018 x 6	1081
.010 x 1¼	103	.020 x ¼	55
.010 x 1½	255	.020 x 5/16	53
.010 x 1¾	629	.020 x ⅜	111
.010 x 2	777	.020 x ½	603
.010 x 2½	268	.020 x ⅝	141
.010 x 3	840	.020 x ⅞	768
.010 x 5	107	.020 x 1	1782
.010 x 6	408	.020 x 1½	675
.012 x ¾	319	.020 x 2	833
.012 x 1	580	.020 x 4½	1310
.012 x 1⅛	106	.020 x 5¾	1451
.012 x 1¼	791	.020 x 6	480
.012 x 1½	461	.022 x ½	96
.012 x 2	536	.022 x ¾	465
.012 x 3	637	.022 x 1	2537
.012 x 6	1238	.022 x 6	906
.015 x ⅜	98	.025 x ⅛	1210
.015 x 3/16	242	.025 x ½	129
.015 x ¼	548	.025 x ¾	94
.015 x ⅜	397	.025 x 1	2504
.025 x 1¼	852	.042 x 1½	634
.025 x 1½	2218	.042 x 2½	273
.025 x 1¾	444	.042 x 3	218
.025 x 2	552	.049 x ¾	78
.025 x 6	403	.049 x 6	708
.028 x 3/16	50	.050 x ¼	168
.028 x ⅜	87	.050 x ⅝	486
.028 x 3	131	.050 x ¾	2908
.028 x 4½	1285	.050 x 1	3120
.028 x 6	1538	.050 x 3	1801
.029 x 5/16	1175	.0625 x 5/16	116
.030 x 2¾	416	.0625 x ⅜	405
.031 x 5/16	961	.0625 x ½	249
.031 x 6	118	.0625 x ⅝	1195
.032 x 3/16	98	.0625 x ¾	1661
.032 x ¼	75	.0625 x ⅞	270
.032 x 1	2082	.0625 x 1	531
.032 x 1¼	192	.0625 x 1¼	1348
.032 x 1½	728	.0625 x 1½	2080
.032 x 3	2065	.0625 x 2	2150
.032 x 3¼	701	.0625 x 2½	3425
.032 x 6	1103	.0625 x 3	831
.032 x 8	2186	.0625 x 4½	4510
.035 x ⅜	247	.080 x 1½	440
.035 x ½	145	.0937 x 1	1251
.035 x ⅝	158	.0937 x 1¼	995
.035 x 1	1765	.0937 x 1½	1129
.035 x 2	304	.0937 x 2	534
.035 x 6	408	.0937 x 3	1221
.041 x 7/16	549	⅛ x 1	547
.041 x 4½	118	⅛ x 1¼	710
.042 x ½	145	⅛ x 1½	1280
.042 x ¾	337	⅛ x 2	1050
		⅛ x 3	1279

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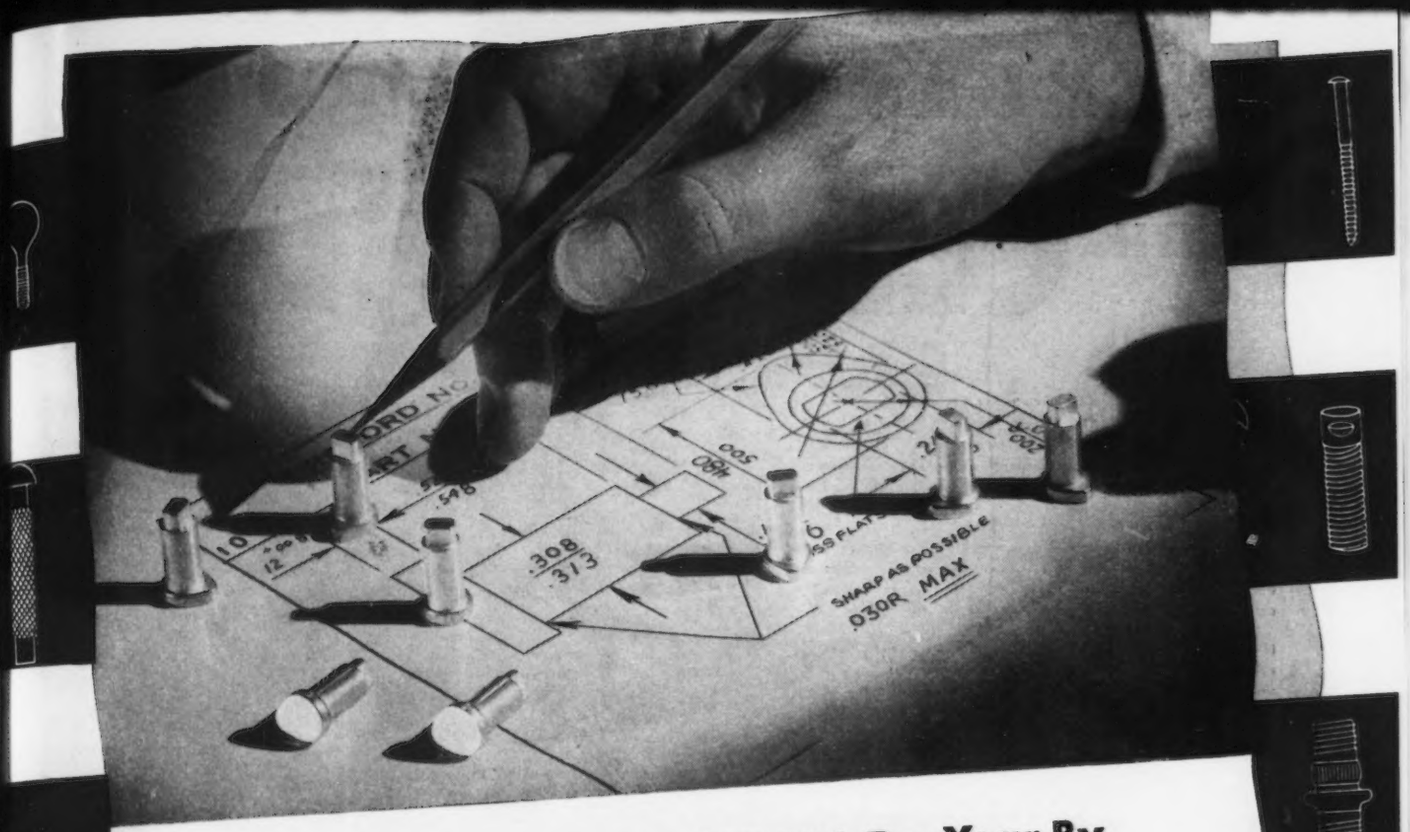

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The little cam above is doing the job of a more expensive part and doing it just as well. The Reid Products Division of Standard Products Company of Cleveland wanted this part for an automobile door lock assembly but found it would cost $38.50 per 1,000 if produced on automatic screw machines. The same part, with its close tolerance and eccentric shape, is being cold headed and cadmium plated for them by Townsend Company for only $25.32 per 1,000. This clear saving of $13.18 per 1,000 becomes mighty important at the rate of 100,000 parts per month. It adds up to $15,816 per year.

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Designers who seek ways to reduce costs find it pays to call on Townsend for small parts. They can be cold headed, pointed, machined, drilled, slotted, trimmed, roll threaded, extruded, pierced, knurled, bent or flattened. Townsend makes parts and fasteners in carbon, alloy and stainless steels—in brass, bronze, copper, aluminum—in a variety of platings and finishes.

To find out how to reduce your costs on small parts send Townsend a sample or sketch. Our engineers will gladly give you an estimate without obligation.

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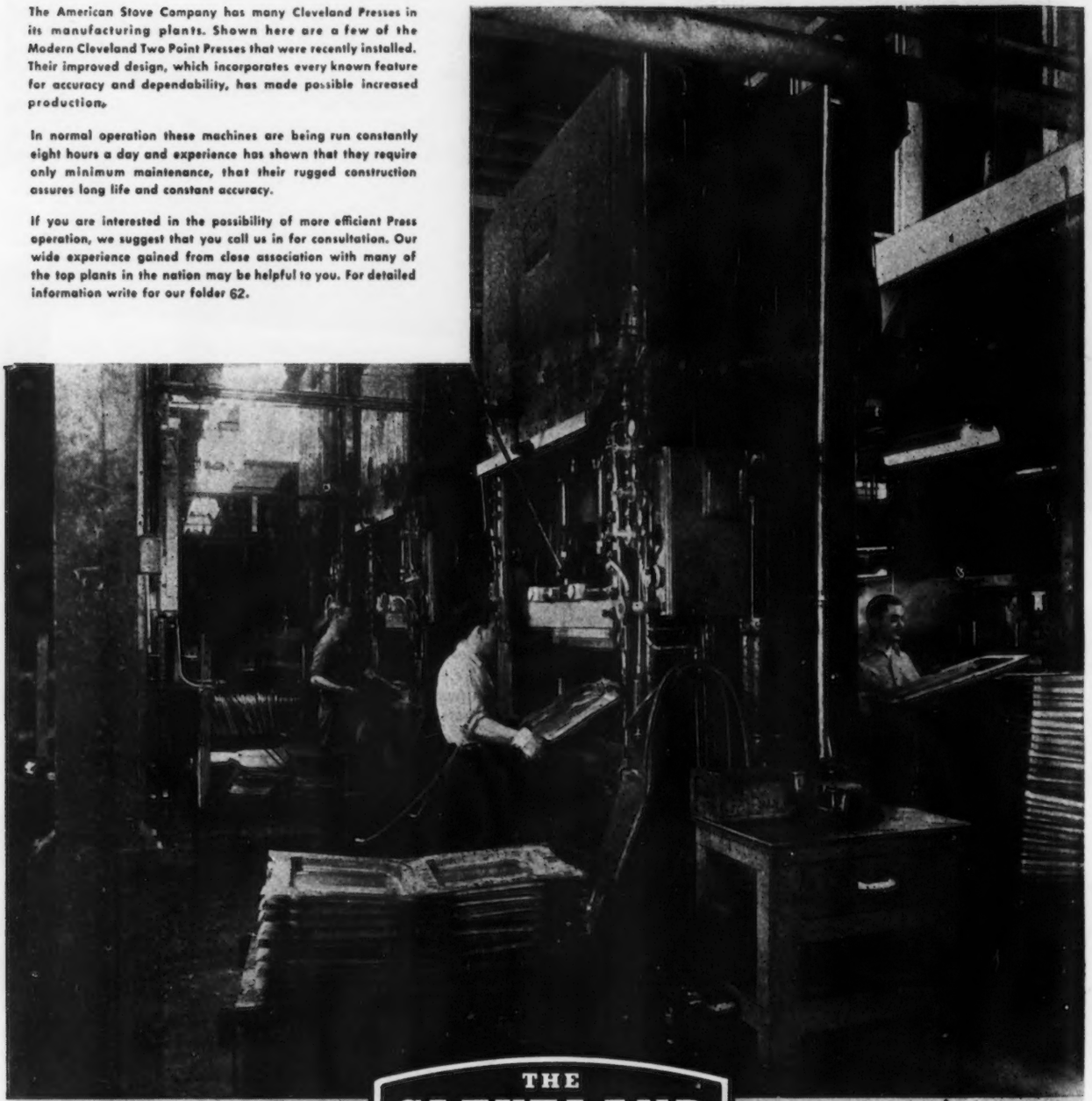

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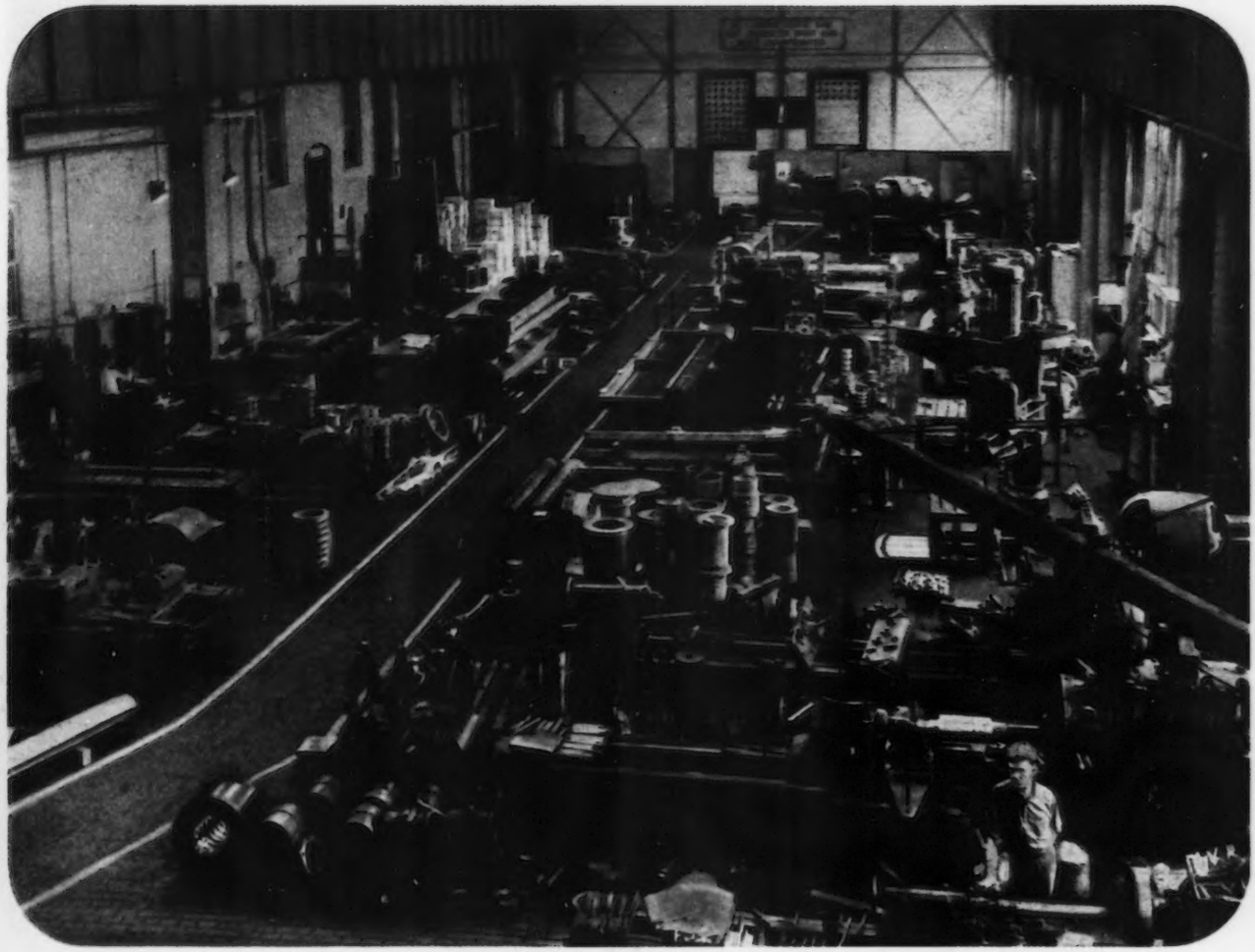
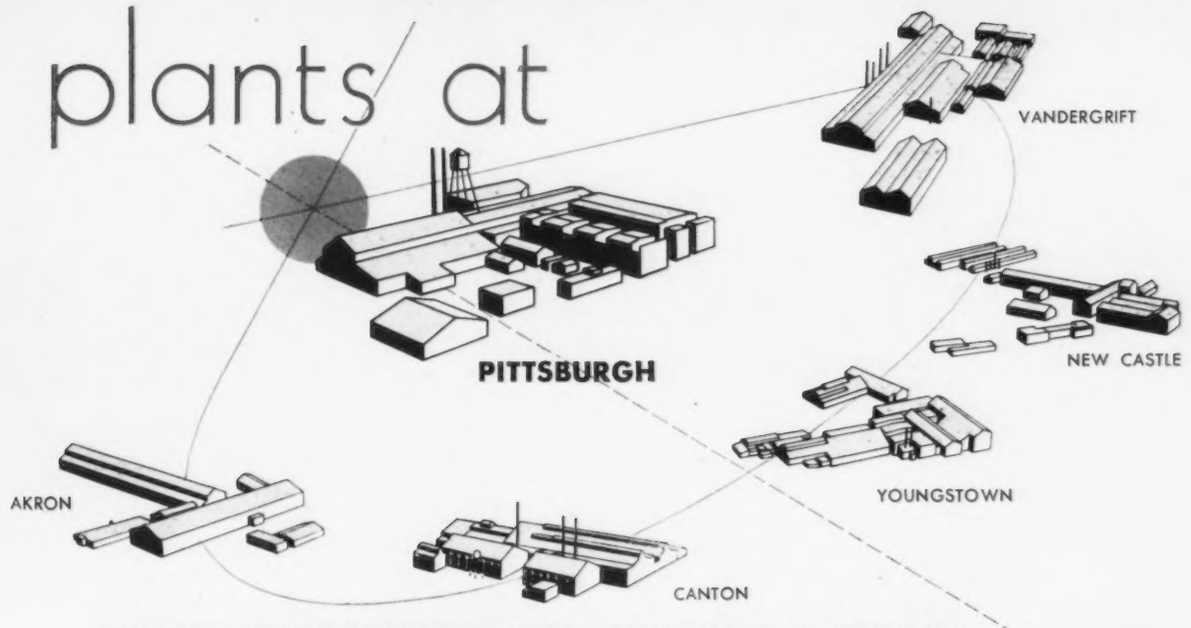


View of Machine Shop, Frank-Kneeland Plant Pittsburgh, Pa.



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Boat-builders launch DOUBLE PROFITS...

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SMOOTH SAILING IN PRODUCTION: Boats almost build themselves . . . with the handling ease, driving speed, and non-slash protection of American Phillips Screws. Every fastening is clean and shipshape . . . *turned up flush, to stay.* And every American Phillips fastening *takes only half as long* as an old-fashioned slotted screw. So costs are really keelhauled!

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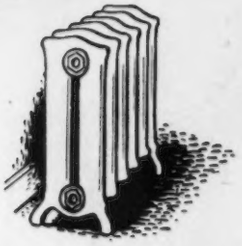
AMERICAN PHILLIPS *Screws*

ALL TYPES

ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)



Durability...

is synonymous with Gray Iron

"A picture is worth a thousand words." Look at this picture of Hiroshima. See the radiators? They're *Gray Iron.* That's part of what we mean by Durability, defined by Webster as: . . . "enduring".

Throughout the year, we have discussed and illustrated the resistance of Gray Iron to wear, heat and corrosion. These characteristics all contribute to Durability, but they're not the whole story.

Gray Irons are available in a wide range of analyses. They provide combinations of valuable properties unmatched by any other material . . . plus ultimate economy.

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Second largest industry in the metalworking field

Gray Iron Characteristics Include:

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- Rigidity
- Low Notch Sensitivity
- Wear Resistance
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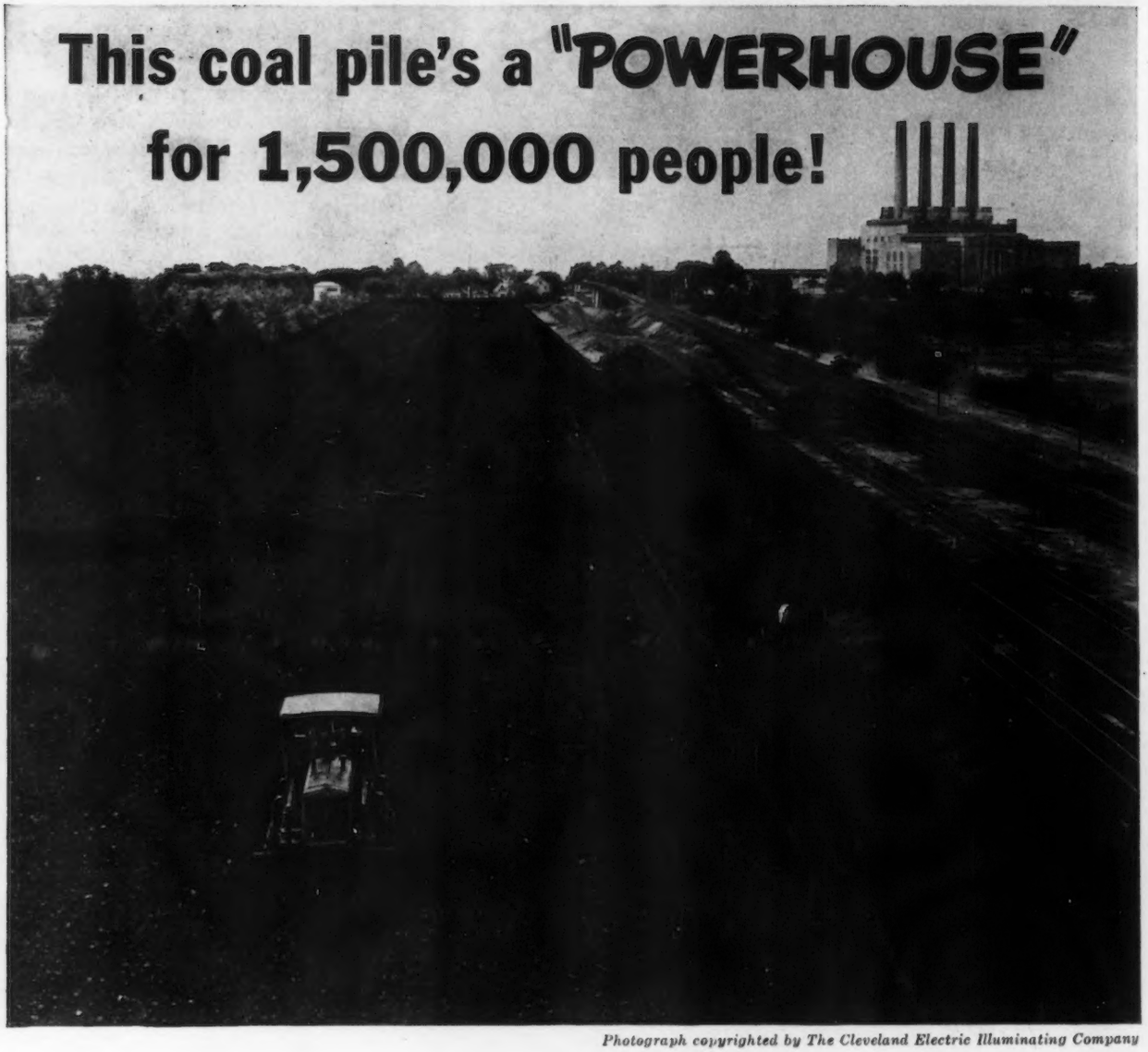

Photograph copyrighted by The Cleveland Electric Illuminating Company

Here's a picture of a 200,000-ton coal pile—ready to put light and power into homes and work places of a large city. Pulverized and blown into the steam boilers of an electric generating plant, this coal will help make living and working brighter and easier for a million and a half people.

Indeed, the demand for coal to be used in generating electricity has more than tripled since 1930, in spite of hydroelectric developments and in the face of the fact that electric power companies now "squeeze" three times as much "juice" from a ton of coal as in 1914.

Today coal provides power companies and other users with the most economical, reliable source of energy. And modern mining is geared to build up and maintain stock piles like the one pictured above. To keep the fires of America burning brightly, both now and in the future, the progressive mining industry is spending hundreds of millions of dollars on new and improved mechanized equipment and facilities.

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Available in 8 models to provide proper tension and sufficient cable pull out for various size buckets. Used as standard equipment by all leading crane manufacturers.

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Fatigue Cracks

BY C. T. POST

Your Two Weeks

• • Latest administrative fad to bite the dust, we understand, is that of closing down the whole plant for two weeks' vacation, letting everyone from the board chairman to the sweeper scatter to the woods and seashore. It sounded like a good idea when it started. Instead of a protracted period of limping along throughout the summer, with substitutes attempting to carry unfamiliar duties along with their own, just lock the door for two weeks. Maintenance men could work efficiently without getting under anyone's toes, and the whole staff could come back together, full of sunburn and vigor.

The idea worked fine for a while. Then more and more plants began to choose the same two weeks, right in the hottest part of summer. Resorts began to experience peak loads such as they never had known before, and requests for reservations had to be turned down. One town, where all the plants decided to close for the same two weeks, roasted collectively in its back yards when limited nearby resort facilities were jammed.

Not that every case has had the same bad experience. But in more plants, this year, the old vacation system is back in effect. If you took your two weeks in June, you'll work yourself to death the rest of the summer and sweat while the late-goers return with tales of cool streams and seashore relaxation. If you go late, you'll be in a state of complete exhaustion by the time your turn rolls around.

Have a nice vacation!

Tired?

• • The other day we got to thinking back to the days of the wartime work peak when we used to put in 10 or 12 hours a day, six days a week, and let holidays go by the boards. Regular vacations were "out" except for a day snatched here and there.

Funny thing, we can't recall being particularly tired. No more so, anyway, than we are now at the end of our bob-tailed five day week. As a matter of fact, if we put in a couple of extra evenings these days, we're generally pooped by the time Saturday rolls around.

If the 30 hr week should become prevalent, we'd probably be continually exhausted. When the boss sees this, he'll say it's simply that we play a lot harder than we work.

Pleasure Bent

"By the end of this month steel company order backlogs will have disappeared for all practical purposes."
Industrial Summary,
THE IRON AGE, *June 22*

• • Just goes to show that it's the impractical things that will be the salvation of the industry yet.

Boloney

• • Passing away a few idle hours trying to memorize your favorite family journal's "Directory of 10,000 Trade Names" the other day, we noticed for the first time that "Boloney" was listed as a trade name the Oman Non-Friction Metal Co., El Paso, Tex., applies to its bearing metal. Checking the manufacturers' directories we couldn't find a trace of the Oman Non-Friction Metal Co. Could someone be kidding?

If you want to check for yourself, copies of "10,000 Trade Names" still are available at $3.00 a throw. Write the Reader Service Department.

Bolshevik

• • "Bolshevik," applying to time bombs, is one trade name that's definitely on the level, though. It's the property of M. & M. Manufacturing Co. Independence, Kans., distributor of oil well bombs.

Eternal China

• • Hard on the heels of an announcement from the post-office department that all but first-class mail for northern China had been suspended comes a letter from the subscription agent for the Yenching University Library, Peiping:

"The University urgently needs all copies published and it is requested that you arrange to . . . hold all copies due as published and accumulate them until we are able to give you further instructions."

Word may come in a few months, or maybe a century or so. But what's a mere matter of time?

Why the Atom Bomb

• • Assuming that world control of the atom bomb is worked out in such a way as to make the government's stockpile surplus, we have a suggestion for disposing of at least one bomb: Drop it on the anonymous member of your f.f.j.'s brains department who wrote last week's photo caption on Kaiser's new aluminum foil mill. The caption: "No Foiling Around."

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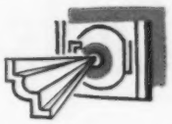
DOGHOUSE!

A designer . . . plagued with production costs of a fluorescent reflector housing . . . solved the double problem of lightness and strength plus fast manufacture. He hadn't considered the economy of finished parts by extrusion  . . . had kept magnesium in the doghouse.

But he asked Aluminum Company of America, light metal headquarters, for help. He found that fellow manufacturers every month are using over a million pounds of magnesium. He found that magnesium machines fast, and has a high strength-weight ratio . . . . that common sense shop practice makes handling magnesium no problem.* He got technical advice and books about designing and fabricating magnesium. Now, instead of fabricating parts like this, he buys immediately available Magnesium Extrusions like this. His production time is slashed. His lighter, stronger reflector housing is outselling competition.

No change in insurance rates.

These two, free books on magnesium and our broad technical experience can help your products, too. Write Aluminum Company of America, sales agent for American Magnesium products, 1701 Gulf Building, Pittsburgh 19, Pennsylvania.

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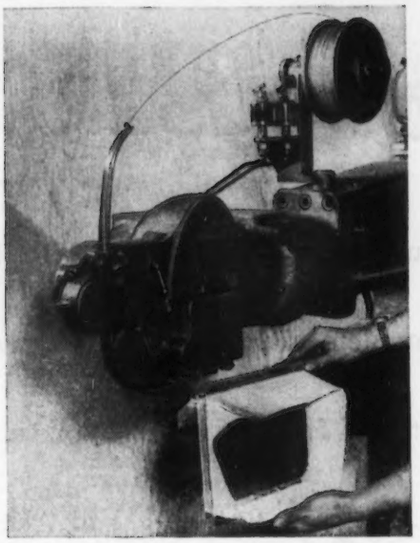

Stitching asbestos cloth to a steel frame with an Acme-Morrison Metal Stitcher. No pre-punching required.

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Dear Editor:

DR. PORTEVIN DISCUSSES EARLY STAINLESS HISTORY

Sir:

Resulting from my article "Who Discovered Stainless Steel," published in the Oct. 14 issue, I have had an interesting letter from A. Portevin, Technical Director, La Revue de Metallurgie, Paris, which I think might make interesting additional material on the subject for your readers.

CARL A. ZAPFFE

Baltimore

● The following has been abstracted from Dr. Portevin's letter:

"During my micrographic study of the chromium steels, I was struck by their resistance to the usual etching reagents (picric and nitric acids) when the chromium content exceeded 9 or 10 pct—similarly with the solution of potassium bisulfate, used by Osmond, also hydrochloric acid. I had at first recommended, during my Carnegie work on special steels, a sulfuric-chromic mixed acid[1], derived from the solution used to dissolve steels for the analysis of carbon according to the method of Wiborg. But this reagent used hot, even to boiling, caused passivation; whereupon I replaced it with a reagent utilizing nascent chlorine (and perhaps also nitrosyl chloride) by using aqua regia, whose rate of attack can be regulated by additions of glycerine[2]. In this manner there was disclosed to me the corrosion resistance or passivity with regard to oxidizing acids: nitric acid, picric acid, sulfuric-chromic acid. This appeared exceedingly interesting to me. But, if I had insisted on the point, I would have found myself in opposition to the conclusions of Leon Guillet, who stated in his text "Les Alliages Metalliques" (Dunod 1906), with regard to chromium steels (p. 331): 'The martensitic steels are too brittle and too hard to be used;' and 'In summary, chromium itself does not impart to steels any property of particular interest, except great hardness.'

"Now, these martensitic steels contained, according to him (p. 326): 7 to 20 pct Cr, 0.2 pct C; 3 to 19 pct Cr, 0.8 pct C, which are exactly the present stainless steels.

"This rejection of the martensitic steels by Guillet followed from his inability to soften by annealing martensitic steels containing nickel—a difficulty which surprised him so much that he discussed the matter again in a later paper, 'Quelques Souvenirs et Quelques Conclusions' (Bull. de l'A.T.F., Oct. 1934, p. 482), in connection with the purely micrographic classification which had been uniquely adopted by Guillet, without associating the study with the transformation points, as did Osmond. This did not permit him to forsee the effect of heat treatments other than those used at the time of his micrographic examination. On the other hand, I had recommended previously[3] that the micrographic diagrams of Guillet 'were not equilibrium diagrams, as is proved by the presence of such transition products as

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My coating is pure tin . . . and smooth as silk. Oh, that's not all! I resist humidity . . .
BUT MY MIND ISN'T ALWAYS ON FOOD!
I'm fast . . . can take quite a bit of abrasion, as you can see!
PEOPLE FIND ME EASY TO WORK WITH!
Want to form me? Go ahead! Easy? You bet- unroll me and I'm always flat and straight- don't draw like other cloths.
I'M ATTRACTIVE PRICE-WISE TOO!
I've the economy of steel with only the small difference for my tin coating. But it's that coating which improves separation by filling my pores!
"BUFFALO" TINNED WIRE CLOTH
Woven in a large range of square meshes; available in rolls or cut pieces; made into reel covers; furnished with hook strips or webbing.
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BUFFALO 2, N. Y.

martensite.' Again, elsewhere[4], I had emphasized the difference between the action of nickel which lowers the transformation on heating, and the action of chromium which raises both the transformation on heating and the equilibrium transformation, these two (chromium and nickel) both increasing the thermal hysteresis of the transformation. These two distinct types of effects of nickel and of chromium were schematically illustrated by two diagrams published at that time[4], although a micrographic examination alone after industrial annealing does not permit distinguishing the difference between them. Since the shifting of the transformation temperature on normal cooling is necessarily limited by the equilibrium temperature, it follows that one is able to obtain pearlite in the martensitic chromium steels with considerably less difficulty than in the martensitic grades containing nickel, which even have difficulty in obtaining the state of bainite. As a matter of fact, more than 20 years ago I had brought these bainite structures, then unknown, to the attention of Osmond. He expressed no opinion on them; but I since published[5] the photomicrographs made at that time. These therefore preceded the bainitic structures since obtained through isothermal tempering.

"The two types of steels, whose photomicrographs[4, 6, 7] I submitted at that time as examples of pearlite obtained by annealing, are precisely those 13 and 17 pct Cr stainless steels used today.

"Thus, to avoid contradicting the previously mentioned opinions, it was necessary for me to proceed with prudence and with not too much insistence. After showing on the one hand the resistance of these steels to reactive oxidizing agents, I had also demonstrated that it was possible to make these steels suitable for commercial usage by appropriate annealing. The importance that I attached to this question is proved not only by numerous publications—Compt. rend.[6], Rev. met.[7], Assoc. internat. d'Essai des materiaux—but also by my filing of a patent through the Dion-Bouton Co., where I was then chief engineer in the Chemical Department (No. 430,362, dated May 31, 1911). The date of this patent lies between those of the notes to Comptes rendus de l'Academie des Sciences and the presentation to the International Assn. for the Testing of Materials. One might point out that this period was not favorable for attracting the attention and the interest, particularly of the chemical industry, to the practical aspects of these results—to the contrary, much advertising and special effort would have been required.

"It is only recently, and from the scientific point of view, that I have outlined the general principles for obtaining corrosion resistance on the basis of three rules which I have called[9]: (1) Rule of homogeneity, (2) Rule of auto-protection, and (3) Rule of limiting concentration. I have shown how these rules find their applications with the classic stainless steels—martensitic, ferritic and austenitic—specifically with regard to corrosion resistance in phosphoric acid[9] and also to sulfuric and hydrochloric acids by means of tungsten and molybdenum added to austenitic grades[10] and for oxidation resistance at elevated temperatures (a) by the classic grades, (b) by classic grades containing aluminum and silicon, and (c) by these steels further improved by an addition of zirconium[11]."

References

[1] A. Portevin, "Contribution to the Study of the Special Ternary Steels," Carnegie School.

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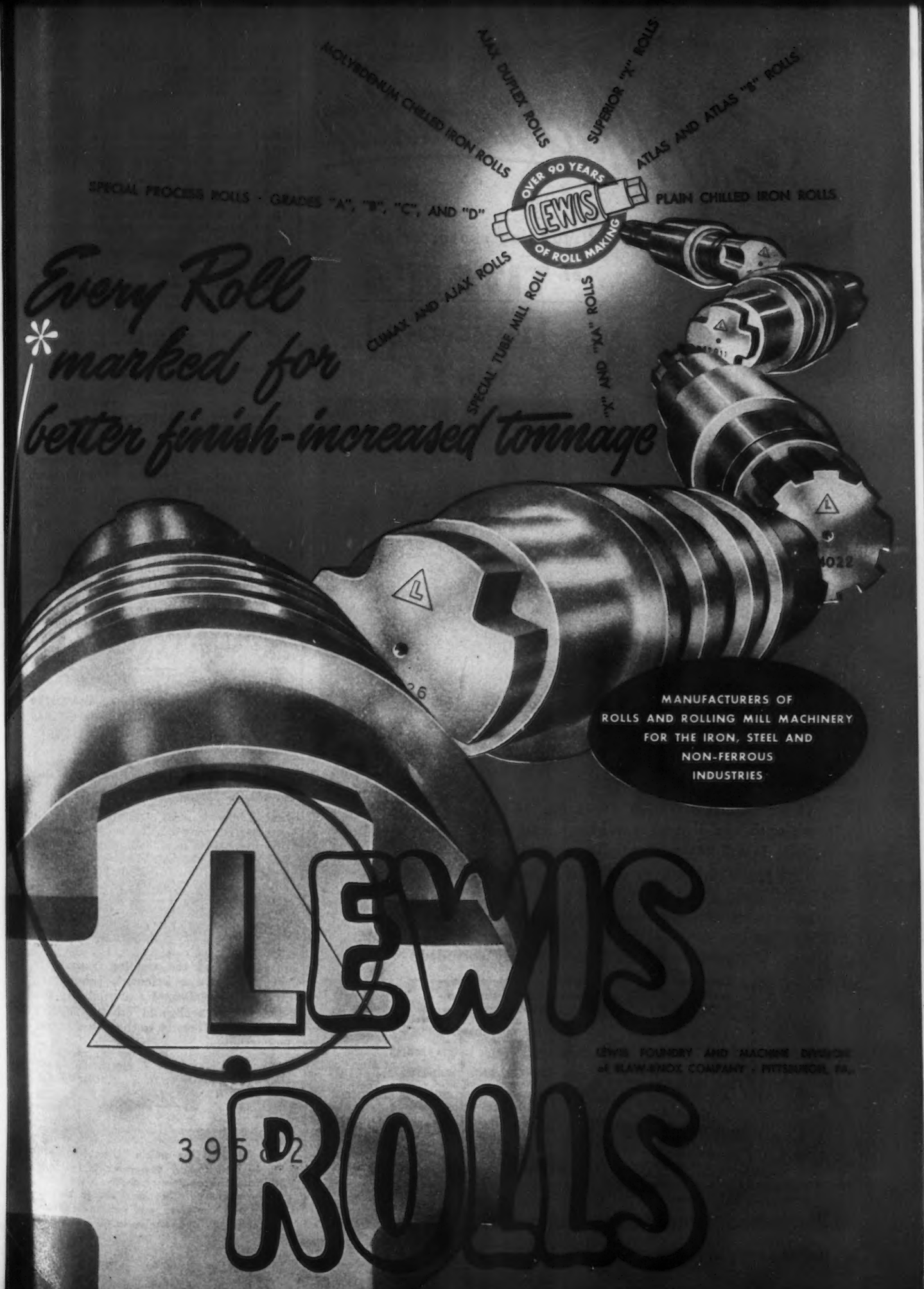
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TI-NIC-O-SIL No. 54 has been thoroughly tested, not only in the laboratory but also under actual service conditions. As an example of its superior corrosion resistance, it showed no signs of tarnish when used for instrument parts in a damp, tropical climate—whereas brass definitely corroded.

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Mem. T. I., p. 230, 1909. Contribution a l'etude des aciers speciaux ternaires, Revue de Metallurgie VI, p. 1329, 1909.

[2] A. Portevin and P. Bastien, "Metallographic Etching Reagents: Reagents Nos. 35 and 30."

[3] A. Portevin, "Present Status of Theories on the Equilibrium of the Iron-Carbon System," Revue de Metallurgie IV, p. 1005, 1907.

[4] A. Portevin, "Note on the Properties and Structures of Some Special Steels Cooled Very Slowly." Session of Nov. 25, 1911 of the International Assn. for Testing of Materials.

[5] A. Portevin, "Note on the Structures Observed in Nickel Steels Very Slowly Cooled," Revue de Metallurgie XXXXI, p. 316, 1939.

[6] A. Portevin, "On Chromium Steels," C. R. CLIII, p. 64, 1911.

[7] A. Portevin, "On Chromium Steels," Revue de Metallurgie VIII, p. 802, 1911.

[8] "Corrosion-Resistant Steels Called Stainless," Revue Universelle des Mines, 8th series, IV, p. 198, 1932. "Corrosion and The Use of Metals," Special Steels IX, p. 287, 1934.

[9] C. R. CXXIII, p. 53, 1931.

[10] Twenty-First Congress of Industrial Chemistry, Lille, Sept. 1933, Revue du Nickel III, p. 75, July 1932.

[11] German Patent No. 662,432, Oct. 29, 1931.

STEEL CONSUMPTION

Sir:

I have noticed with great interest the report in the May 26, 1949 issue entitled "Steel Consumption in 1948." This appears to me to be a real contribution to the literature on the distribution of steel and I shall appreciate it very much if you will send me about three copies of the article, including the analysis by important industrial areas.

EARL A. GRAHAM
Economist

Federal Trade Commission
Washington 25

Sir:

We would appreciate receiving the report on "Steel Consumption in 1948—by states, by industrial areas, by major products."

T. R. HANCOCK, Manager
Marketing Research Div.

General Electric Co.
Bridgeport, Conn.

● Additional copies of this detailed report on steel consumption by the metalworking industry in 1948 is available gratis to readers. Write Reader Service Dept., THE IRON AGE, 100 E. 42nd St., New York 17. —Ed.

WELDING MANUAL

Sir:

A copy of the welding manual is desired for the Scientific Library of the Patent Office. Its availability for use in research and other purposes will add materially to the value of our collection.

C. E. HAGLUND
Executive Officer

Dept. of Commerce, U. S. Patent Office
Washington

CORRECTION

In fig. 5 of the article "Ultrasonic Testing of Tool Steels," appearing in the May 19 issue, the photomicrographs were incorrectly numbered. Section I should be section II and vice-versa, and section III should be section IV and vice-versa.—Ed.

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Putting Air to Work!

This recent DeVilbiss installation in a modern stove plant increased production three times. Porcelain enamel ground coat is applied to about 75% of all parts which were previously japanned and about 90% of white parts are now being produced in one coat.

Wind was first used as a source of power many centuries ago. It was harnessed to drive windmills in Persia as early as 915 (A.D.) and is still used by the Dutch to power the windmills that prevent flooding of the low countries.

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- The difference between Weiger-Weed wheels and ordinary wheels is the less amount of dressing required.

In one of the nation's largest tube mills

WW WEIGER-WEED SEAM WELDING WHEELS

were found by actual record to require dressing only once every three weeks.

The wheels they replaced needed dressing once a week, requiring 6 man hours, totaling 312 man hours a year. In the same period, redressing Weiger-Weed wheels made of the alloy properly engineered for the application added up to only 104 man hours, a saving of 208 man hours, or a full month!

And all this time, the Weiger-Weed wheels were in service—producing. This is only one instance, and the time saving would, of course, vary under different plant conditions. But, for your problem in seam welding or any other phase of resistance welding, the answer is in the *metallurgy* that goes into Weiger-Weed products. Seam welding wheels, dies, electrodes, replaceable tips are made from high strength, high conductivity alloys, developed by Weiger-Weed engineers for long life on production runs and minimum down time.

Weiger-Weed wheels are supplied to your specifications, either finished ready for use, or in rough form for you to finish. Several sizes of blanks are carried in stock. You are cordially invited to ask for Weiger-Weed service on any resistance welding problem—Weiger Weed & Company, Division of Fansteel Metallurgical Corporation, 11644 Cloverdale Avenue, Detroit 4, Michigan.

For complete line of WW quality welding supplies and prices, ask for Bulletin 14.650

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Resistance Welding ELECTRODES
DIES • TIPS • WHEELS • HOLDERS
DIVISION OF FANSTEEL METALLURGICAL CORPORATION

11501-B

BLAST FURNACES

Sir:

I should be very thankful if you could send me the addresses of the U. S. blast furnaces. I am mainly interested to know the blast furnaces on the Pacific Coast. . .

J. R. PLANNER
Palma, Mexico

● A list has been mailed.—Ed.

BALL BEARING STEELS

Sir:

Kindly send me tear sheets of the three-part article on "Metallurgical Aspects of Ball Bearing Steels" which appeared in the Sept. 2, 9 and 16 issues.

L. P. TARASOV
Research Laboratories
Norton Co.
Worcester, Mass.

TITANIUM

Sir:

Will you kindly send us tear sheets of the following articles on titanium: "Melting and Casting Titanium," Jan. 13 issue; "Physical Properties of Titanium Alloys," Dec. 30 issue; and "Symposium Helps Correlate Titanium Research and Development," Dec. 23 issue.

G. V. CORBETT
Advertising Manager
Driver-Harris Co.
Harrison, N. J.

DUCTILE CAST IRON

Sir:

Kindly send us a copy of "Ductile Cast Iron" from the Feb. 17 issue.

A. C. ZIEBELL
President
Universal Foundry Co.
Oshkosh, Wisc.

OXYGEN IN THE CUPOLA

Sir:

Being interested in the use of oxygen in our cupola, we would appreciate copies of the following: "Oxygen Enriched Cupola Blast," May 20, 1948 issue; "Oxygen Enrichment of Cupola Blast," Apr. 22, 1948 issue; and "Uses Oxygen Enriched Cupola Blast," Jan. 27, 1949 issue.

JOHN D. ABELL
Works Engineer
International Harvester Co. of Canada
Hamilton, Ontario

CYLINDRICAL GRINDING

Sir:

May we have 3 reprints or tear sheets of "Speeds and Feeds to Use in Cylindrical Grinding" which appeared in the Mar. 3 issue.

M. C. PARCHE
Librarian
Carborundum Co.
Niagara Falls, N. Y.

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This powerful Cincinnati Bickford Super Service Radial, with its balanced 10′ arm and 26″ diameter column, and modern "clear visibility" head, step saving, time saving centralized controls, special circular base, has brought a high efficiency to the job.

In contrast to this massive machine we show above the 9″ dia. col., 4′ arm Super Service Radial mounted on a track, and here again Bickford engineering and Bickford versatility have met the user's needs—and again given him high production at low cost. Consult us on your drilling problems.

Write for Bulletin No. R-22—on the 26″ column Super Service Radial—and Bulletin No. R-21B, covering the 9″ diam. column Super Service Radial.

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The Chambersburg CECO-DROP is a new piston-lift, gravity-drop hammer in which the ram is lifted by air or steam rather than by friction operated boards. There are fewer operating parts, shock-absorbing mechanisms are employed, lubrication is automatic and operation is simple and safe. In shop after shop, over the past few years, the CECO-DROP has amply proved that it can forge more minutes per hour, make more forgings with fewer blows, costs less to operate and is safer and easier on the hammerman.

Write for Bulletin 11-L-9

CHAMBERSBURG SINCE-1897

CHAMBERSBURG ENGINEERING CO. **CHAMBERSBURG IMPACT** CHAMBERSBURG, PENNA.

independently of the other to insure close control of volume and pressure. Designated as valve No. 725, it is designed for either a high pressure drop and small volume or a low pressure drop and large volume, thus operating beyond the limitations of a single valve. This valve is also available in various combinations of sizes and for higher pressures. *R-S Products Corp. For more information, check No.* 22 *on the attached postcard.*

Resistance Wire

A NEW alloy known as Jelliff Alloy 1000 achieves a resistance of 1000 ohms per circular mil foot. Workability and an extended range within which the temperature coefficient of resistance remains substantially constant are other characteristics. Resistance to surface corrosion is said to equal that of nickel-chromium alloys. High ductility, great tensile strength and easy solderability make it fast and easy to handle in manufacturing processes. It is non-magnetic. Jelliff Alloy 1000 is drawn to all standard diameters from 0.0100 to 0.0009-in. and in small ribbon sizes. *C. O. Jelliff Mfg. Corp. For more information, check No.* 23 *on the attached postcard.*

Floor Surfacing Material

DESIGNED to resist conditions that are destructive to floors of asphalt and concrete, a new floor surfacing material called Quartex is applied directly over the old surface. Quartex is an extremely hard, nonporous material produced from quartz, iron-reinforcing and cementing agents. It is delivered ready mixed and only a small amount of water is added at the time of application. Resurfaced areas, about ½ in. thick, may be subjected to light traffic after about 12 hr; heavy loads in approximately 36 hr. *United Laboratories, Inc. For more information, check No.* 24 *on the attached postcard.*

Plastic Refractory

A NEW plastic refractory known as DPM Ramtite is premixed at the factory and ready for immediate use after spreading it out and sprinkling with water. DPM is available in the same three grades as regular Ramtite. It can be stored indefinitely without special precaution because exposure to freezing temperatures or hot dry atmosphere will not cause any damage. It is suitable for ferrous and nonferrous melting furnaces and ladles. *Ramtite Co. For more information, check No.* 25 *on the attached postcard.*

Cloth Adhesive Tape

FOR packaging, shipping, and production operations in manufacturing, a new tape is made of low count cloth and has a pressure sensitive adhesive. It is particularly adapted for holding and sealing operations and as a protective material. It is known as Mystik Self-Stik tape No. 5810 *Mystik Adhesive Products. For more information, check No.* 26 *on the attached postcard.*

Tension Wrench

AN improved tension wrench has a high limit of 100 ft-lb that can be increased to 150 ft-lb by using an extension designed for the purpose. The wrench is calibrated in foot-pounds and centimeter-kilograms. In operation an adjustment is set to the desired tension and a toggle action releases the pressure when that tension is reached. The setting remains fixed until changed manually. The wrench is recommended for industrial applications in which nuts or bolts are tightened to specification; and for automotive use in tightening cylinder heads, bearing caps, spark plugs, and other parts where tension must be controlled. *Sunnen Products Co. For more information, check No.* 27 *on the attached postcard.*

Steel Work Bench

A NEW work bench is made for the heaviest industrial and automotive uses with a 12 gage steel top. It is 6 ft long x 34 in. high x 28 in. deep. The legs are sloped back so that there is no stumbling; electrical knockouts for double outlets are provided in front of each leg; back rails keep items from rolling off the top or bottom shelf; and a drawer is pilferproof and mounted on rollers. The bench may be bolted to the floor through concealed holes inside the flange of the end panel. Small lathes, drill presses, bench grinders, and punch presses can be attached and operated with ease on the top of the bench. *Equipto. For more information, check No.* 28 *on the attached postcard.*

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FLOOR MACHINES, models C, D and E are featured in a group of bulletins. Brush direction can be changed by a reversing switch and this feature is said to increase brush life. Model E has counter-rotating twin brushes. Accessories are listed. *Corbin Screw Div., American Hardware Corp. For more information check No. 29 on the attached postcard.*

AIR POWER CLAMPS in horizontal thrust models with from 0.8 to 28 times air line pressure and in vertical thrust models are pictured and described. A midget model is featured for light work such as operations involving joining by welding, riveting or bolting two or more component parts. *Mead Specialties Co. For more information, check No. 30 on the attached postcard.*

SPEED CHANGER which is described as a miniature variable-ratio model is featured in bulletin No. 99. Adjustable speed drive, operating principle, applications and design features are described with dimensional drawings and characteristic curves. *Metron Instrument Co. For more information, check No. 31 on the attached postcard.*

FLOOR REPAIR and resurfacing discussion is contained in folder. Pictures show applications in aircraft, railroad, marine and other industries. The material may be applied over concrete, brick, stone, composition, steel or wood floors. *Flexrock Co. For more information, check No. 32 on the attached postcard.*

PRECISION INVESTMENT CASTINGS folder contains information on dimensional tolerances, tooling costs, delivery and materials. Metallurgical and other services are described and information is given on ordering castings. *Engineered Precision Casting Co. For more information, check No. 33 on the attached postcard.*

EXPANSION JOINT selection and application design guide is a 28-p bulletin written in non-technical language and containing numerous illustrations, charts and tables. It has been prepared to simplify selection of these joints in piping systems. *Chicago Metal Hose Corp. For more information, check No. 34 on the attached postcard.*

CUTTING FLUIDS for better machining is the subject discussed in a 73-p booklet with illustrations. Factors in the selection of cutting fluids, how to get the most out of cutting fluids and 10 rules for prolonging tool life are some of the points covered. *D. A. Stuart Oil Co. For more information, check No. 35 on the attached postcard.*

FLOOR CRANES are the subject of catalog insert sheets which describe three of the 12 models available with capacities ranging from one to three tons. Several illustrations show these models in use and operating features are shown. Specifications and special features are described. *Ruger Equipment Co., Inc. For more information, check No. 36 on the postcard.*

FURNACES, gas fired for production tempering, are the subject of bulletin 53. Diagrams show heat flow and cutaway view shows furnace loaded with parts. Operating features are fully described and several photographs show case histories. Other standard uses for this furnace are listed. *Lindberg Engineering Co. For more information, check No. 37 on the attached postcard.*

CEMENTED CARBIDES listed in 77-p catalog No. 49 cover a wide range of varieties including single point brazed tools, grooving blades, tool blanks, tools and inserts, roll turning tools face mills and extruded shapes. Inception, development, diversification, and application of the metal is discussed in detail. *Kennametal Inc. For more information, check No. 38 on the attached postcard.*

SHOP PRESSES of 60 and 80 tons capacity are highlighted in catalog No. 312. These presses are recommended for machine shops, tool rooms, foundries and industrial shops. They are illustrated and features are explained in considerable detail. Hydraulic power pumping units are also shown. *Rodgers Hydraulic Inc. For more information, check No. 39 on the attached postcard.*

MILLING MACHINES of knee type style featuring a built in chucking table to simplify workholding problems are discussed in catalog. Development is intended to facilitate handling of irregularly shaped workpieces without special toolng. Twenty-four machines are available in plain or vertical styles. *Kearney & Trecker. For more information, check No. 40 on the attached postcard.*

LATHE features are pointed out in bulletin No. 180 which illustrated a 14 in. tool room lathe, a 20 in. medium duty and a 25 in. heavy duty engine lathe. Headstock is shown with cover removed. Bed, ways, feeds and threads, carriage and apron, compound rest and cross slide, tailstock and taper attachment are also shown. *Springfield Machine Tool Co. For more information, check No. 41 on the attached postcard.*

STEEL WINDOWS and industrial doors are the subject of 88-p catalog. Window models are illustrated separately and are also shown in typical architectural settings for which they are designed. Construction features are illustrated in cut-away illustrations. Drawings and sketches are included for all types of installations. *Truscon Steel Co. For more information, check No. 42 on the attached postcard.*

SHAPER dimensions and specifications are shown on folder which illustrates a utility model shaper. Table is supported directly on the cross rail without an apron and is said to be heavy enough to take full load without table support. Arrangement brings table closer to column, reducing overhang. *Cincinnati Shaper Co. For more information, check No. 43 on the attached postcard.*

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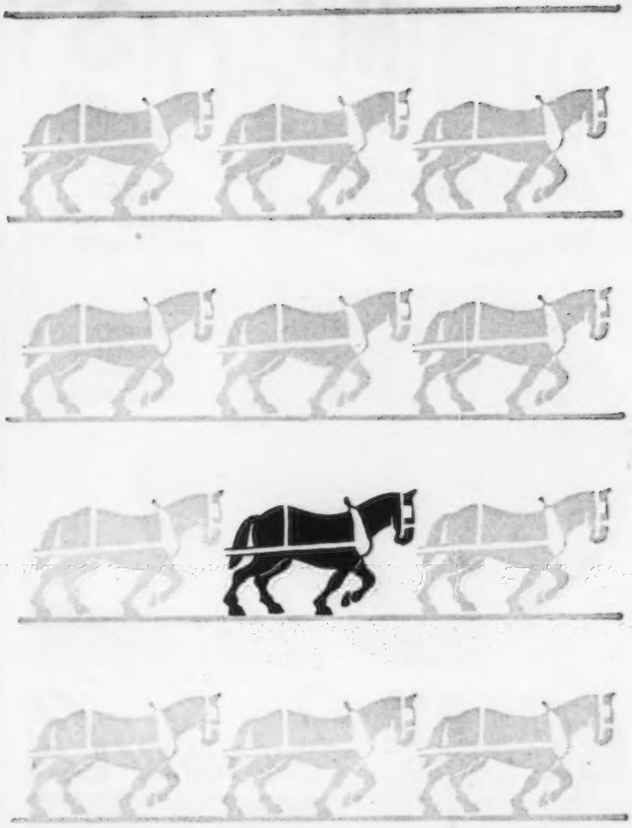

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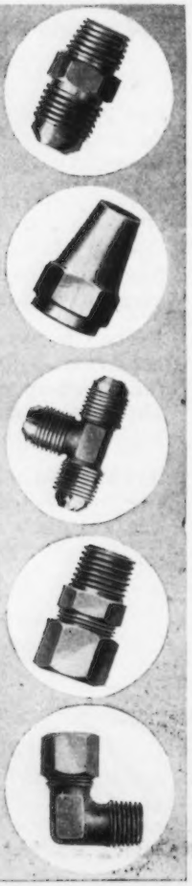

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Bids must be received in the Grand Prairie Regional Office of War Assets Administration prior to 2:00 P.M., *July 14, 1949.* Bids will be publicly opened and read at 2:00 P.M., *July 14, 1949,* at the Grand Prairie Regional Office, Grand Prairie, Texas. No special bid forms are required, but must be in writing and acknowledge the Standard W.A.A. Sales Conditions and the Special Conditions covering this sale, which are stated below.

OFFERED TO ALL BUYERS—The priorities and preferences established by the Surplus Property Act of 1944 are no longer in effect and all buyers participate on an equal basis.

Property in this sale may be withdrawn up to the time of a sales contract with the purchaser for consideration of National Defense, Disaster Relief and other special programs established by legislation.

DESCRIPTION OF LOCOMOTIVE

LOCOMOTIVE, Diesel, electric, U. S. Reg. No. 8809, Whitcomb Locomotive Co., Rochelle, Illinois, Class 650K19A, Serial No. 60524, 400 H. P. weight 65 tons, dual Buda diesel Model 6DC-1879, Serial Nos. 30071 and 30074, 200 H. P. each 1200 RPM, D-3012 H.P. with supercharged 6 cylinder 6¾" bore stroke, contract #W33-09TC2233, Spec's 65DE19A. Westinghouse traction motor, type 970A, Westinghouse auxiliary generator Y6-41-B, voltage regulator type JW23OD, built in 1944, JANMAT Listing No. GPO-85-225.

Sale will be subject to W.A.A. Standard Sale Conditions, except as modified by the special terms and conditions under which this offering is made. Prospective buyers are urged to inspect property since it will be sold on an "As Is—Where Is" basis. The government assumes no responsibility for any services incurred in removal and makes no warranty as to the accuracy of description or physical condition.

NOTE TO BIDDERS—All buyers must make a deposit of twenty-five (25%) percent of the total bid in cash, postal money order, cashier's check or certified check. The balance of the purchase price must be paid within twenty-four (24) hours after notification to the successful bidder. Credit will be extended only to Federal, State and Local Agencies. All other types of buyers shall be required to pay cash or its equivalent, in full.

In the event of default on the part of the purchaser, the purchaser and vendor agree that twenty-five (25%) percent of the purchase price be remitted to the seller as liquidating damages and purchaser agrees that the deposit accompanying the bid may be retained by the vendor for application toward liquidated damages so incurred.

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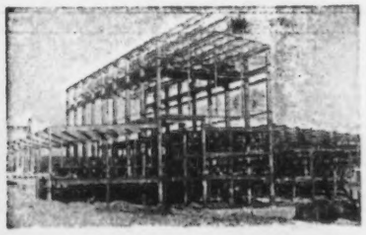

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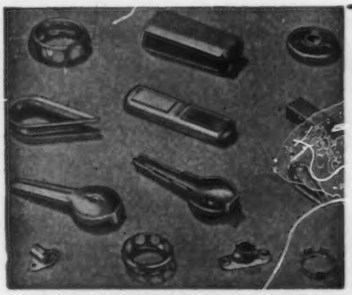

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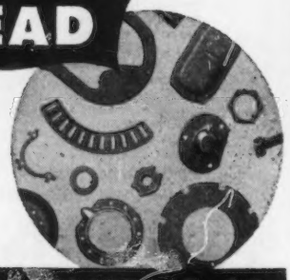

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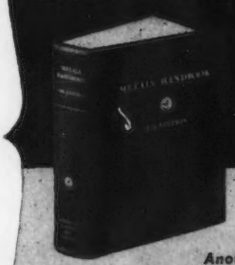

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12'x¾" All Steel Hydraulic Press Brake, Complete with Motor, Compressor & Dies
32' x ½" Press Brake; 1000 ton Capacity, Motor Driven with 75 H.P. Motor

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70 ton Steelweld Bulldozer, Motor Driven 18" Stroke, Crosshead 15" x 74¼"

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10 ton Milwaukee 33' Span 440/3/60 AC
15 ton Harnischfeger 27' Span 230 Volt DC
5 ton Lidgerwood Hammerhead Gantry, Max. Hook Travel 30', Max. Radius of Hook 50'. Motors 440/3/60

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2 ton Shepard-Niles	28' Span 550/3/60 AC.
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5 ton Shepard-Niles	36'6" Span 230 Volt DC.
5 ton Wright	47' Span 440/3/60 AC.
5 ton Harnischfeger	59' Span 440/3/60 AC.
5 ton P & H	55' Span 230 Volt DC.
5 ton Northern	76'3" Span 220/3/25 AC.
7½ ton Harnischfeger	31'1" Span 230 Volt DC.
10 ton Wright	22'4" Span 440 Volt AC.
10 ton Northern	50' Span 230 Volt DC.
10 ton Ederer	72'5" Span 220/3/60 AC.
10 ton Shaw With 2 5-ton Trolleys	80' Span 220/3/25 AC.
20 ton Euclid With 10 ton Auxiliary	52' Span 230 Volt DC.
50 ton O.E.T.	50' Span 220 Volt DC.

200 ton ALLIANCE Overhead Electric Traveling Crane 100' Span 25 ton Auxiliary Hoist Five 230 Volt DC Motors

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25 ton Henry & Wright Dieing Machine, Double Roll Feed, 1½" Stroke, Scrap Cutter, Motor Driven
60 ton Henry & Wright Dieing Machine, Double Roll Feed, 2" Stroke, Motor Driven
75 ton Henry & Wright Dieing Machine, Double Roll Feed, 6" Stroke, Motor Driven

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60,000 lb. Aetna Standard Single Chain Draw Bench, 45 Ft. Length of Draw, Motor Driven—NEW 1946

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1¼" Acme
1¼" Pawtucket
3" 4" & 5" Ajax
1½", 2", 4", 5", 6", 7½" National

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2 Ton Heroult Nose Tilt Type Melting Furnace
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No. 5 B Sykes Gear Generator. Will cut Gears from 3" to 61" diameter by 18" wide on spur and 21" on Herringbone. Complete with electrical equipment.

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3000# Chambersburg M.D. with 2 Motors
2500# Erie

HAMMERS—STEAM DROP
1000, 2000, 2500, 35,000# Chambersburg
1000, 1500, 2000, 4000 lb. Erie

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450, 650, 800, 1000, 1100, 1600, 2500, 4500# N-B-P
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1000# Chambersburg Pneumatic Motor Driven Forging Hammer. Complete with Motor
48" x 48" Chambersburg CecoStamp Hammer
48" x 86" Chambersburg CecoStamp Hammer
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2L Gisholt Saddle Type Turret Lathe, Spindle Bore 4-1/16", Hydraulic Speed Selector, Landis Threading Head—New 1947
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46" Magnet, 7½ KW, 220 Volt D.C.

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5 ton Morgan Bridge Type Manipulator Complete with Electrical Equipment

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42"x36"x16' Ingersoll Planer Type Milling Machine, 1 Rail & 2 Side Heads, Motor Dr.

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No. 10-B Gray Turret Head Metal Nibbler, M.D. Capacity 9/16", With Circle Cutting Attachment

PLANER—OPENSIDE
72"x72"x16' Cincinnati Hypro Openside Planer, Late

PLANER—PLATE EDGE
30' x 2" Cleveland Plate Edge Planer, Motor Equipped with 14 Pneumatic Jacks

PLANER—ROTARY
No. H-22 Espen Lucas Rotary Planer, 42" Head Belted Motor Drive

PRESSES—HYDRAULIC
375 ton Elmes Hydraulic Press, 12" Stroke, Distance Between Columns 48" x 45"
600 ton Hydraulic Extrusion Press, 35½" Stroke, 29" x 26" Platen Size
800 Ton Sellers Hydraulic Press, 12" Stroke, 27" x 32" Distance Between Columns
1000 ton Chambersburg 4-Column, Hydraulic Press, 18" Stroke Bed Area 48" x 48"
1500 ton Wood 4-Column Hydraulic Press 18" Stroke, 198" x 64" Platen Area
2000 ton Wood Hydraulic Press, 9" Stroke, 24" x 85" Bed Area
4000 ton Steam Hydraulic Forging Press, 128" x 64" Between Columns. Single Stroke 7", Total Stroke 80". Complete with Accessories

PRESS—HYDRAULIC WHEEL
200 ton Caldwell Hydraulic Wheel Press 36" Between Parallel Bars

PRESS—INCLINABLE
500 ton G-1084 Clearing Gap Frame Inclinable Press 18" Stroke, 48"x120" Area of Bed

PRESSES—KNUCKLE JOINT
No. K-1200-30 Clearing Knuckle Joint Press 200 Ton Capacity 4" Stroke, 31" Between Uprights
No. 24K Bliss Knuckle Joint Press 400 Ton, 4" Stroke, 29 x 20" Bed Area

PRESSES—STRAIGHT SIDE
No. 73½ Bliss Press Flywheel Type, M.D., 4" Stroke. 16" x 16¼" Bed Area
No. 66-C Niagara Double Crank Press 2" Stroke, Bolster 17½" x 48"
No. 306 Bliss Single Back Grd. Press 10" Stroke, Bed Area 31" F to R
No. F1200-36 Clearing Single Acting Press 200 ton, 18" Stroke, 36 x 38" Bed Area

PRESSES—TOGGLE DRAWING
No. 408A Bliss Toggle Drawing Press 300 Ton, Bed Area F to B x R to L 54" x 72"
No. 14B Bliss Toggle Drawing Press, Stroke of Blank-holder Slide 24", Stroke of Plunger Slide 28", Bed Area F to B x R to L 48" x 52"

PRESSES—TRIMMING
No. 76½ Bliss Trimming Press 8" Stroke, Bolster 26¼"x26¼"

PUNCH—BEAM
No. 5 Hilles & Jones Beam Punch, Arr. Geared Motor Drive. Designed for punching angles either leg without turning or punching webs & flanges of H columns up to 14" Incl.

PUNCH & SHEAR COMBINATIONS
Style G Cleveland Punch & Shear Single End 60" Throat. Capacity Punch 2" thru 1" plate
Style EF Cleveland Double End Bar & Angle Shear Motor Driven. Completely equipped NEW 1947
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No. 91 Size 16 Hercules Universal Ironworker, Capacity Punch 1 1/16 thru ⅝", Shear, Round 1⅛", Square 1⅜", Angles 6 x 6 x ⅝"
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8 x 6 Blake & Johnson Single Stand 2-High
8 x 8 Schmitz Single Stand 2-High
9 x 20" Schmitz Single Stand Two High
10 x 12" Cold Rolling Mill 3 Stand 2 High
12 x 24" Waterbury-Farrel Single Stand Two High
18" x 30" Farrel Two Stand Two High
20" x 30 Mesta Single Stand Two High
20 x 36 Farrel 2 Stand 2 High
20 x 40" Mackintosh Cold Reduction Mill
20 x 42" Waterbury-Farrel Single Stand Two High
23¼" x 60" Mack-Hemp 3-Stand Breakdown Mill
9" Two High Hot Mill for rolling strip steel.

ROLL—CORRUGATING
Stamco Corrugating Roll, Motor Driven, Rolls 48" wide, designed for 1¼" Corrugations. Capacity 28 Gauge Steel

ROLL—FORMING
Yoder 12 Stand Cold Roll Forming Machine, Spindles 1½" Dia. Roll Width 4"

ROLLS—TAPER FORGING
No. 1 Ajax Taper Forging Roll, Motor Drive
No. 2 Ajax Taper Forging Roll, Motor Drive
No. 5 Ajax Taper Forging Roll, Motor Drive

SAWS
42" Newton Type U-32-A Heavy Duty High Speed Cold Saw, Capacity 16" Round or Square
AVEY Band Saw, Motor Driven Capacity 6" Round or Square

SHEARS—ALLIGATOR
No. 1½ Doelger & Kirsten Alligator Shear, Motor Driven. Capacity 9/16" Stainless Steel
No. 2 Doelger & Kirsten Alligator Shear, Motor Driven. Capacity 3" Round

SHEAR—ANGLE
No. 3 Hilles & Jones Double Angle Shear, Capacity 6 x 6 x 1" Motor Driven

SHEAR—BAR
No. 47 Buffalo Bar Shear, Motor Drive. Capacity 1½" Round, 1⅜" Square, 3x¼" Flat, 4 x ⅜" Angles

SHEAR—BILLET
No. 6 Mesta Billet Shear, Motor Driven. Capacity 6" x 6" Square Billets

SHEAR—MISCELLANEOUS
Bliss Guillotine Type Crop End Up-Cut Shear. Capacity 78" wide hot strip 1" thick

SHEARS—ROTARY
No. 25A Quickwork Whiting Rotary Shear, M.D. Capacity ¼" Plate
No. 500 Kling Rotary Shear, Motor Driven. Capacity ½". Complete with circle cutting, flanging and joggling attachments

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12' x ⅜" Cincinnati—Motor Driven
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6" Blake & Johnson Gang Slitter, Complete with numerous accessories
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48" Yoder Gang Slitter, Motor Driven—Late Model

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No. 4 Sutton Straightening Machine, Motor Drive, Capacity 2" to 6" Round, Timken equipped
Tishkin Automatic Straightening & Cut-Off. Capacity 4" wide x ⅛", Motor Driven

SWAGING MACHINES
No. 2 Langelier—New 1947
No. 3-A Standard—New 1942
No. 4-A Standard—New 1942
No. 6A Standard Rotary Swager, V-Belt Drive, Capacity Tubes 3¾", Solids 1¼"
#412 Etna Machine Co. Rotary Swager Arr. M.D.—Capacity Tubing 4", Die Length 18"—New 1945
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100,000# Olsen Universal, Motor Driven
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1—Type CAB-TT.

SEGMENTED CABINET TYPE
1—Type CAB-TT-WRB.
1—Type CAB-60-TT-WRPB.

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1—Type CT-18 x 14 Slush.
1—Type CT-18 x 15-WRBD.
1—Type CT-18 x 14-WFRS.
1—Type CT-20 x 18-WRBSL.
1—Type CT-16 x 20-WRBS.
1—Type CT-18 x 14-WCB.
1—Type CT-18 x 16-WRCB.
1—Type CI-18 x 14-WFRS.

MONORAIL CONVEYOR TYPE
1—Type PT-22 x 50-WRFR.

MISCELLANEOUS
1—Industrial basket type SB36 x 36-W.
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2—#2 Wheelabrator Multi-table TABLAST
1—New Pangborn roto-blast.
1—New Pangborn BVR-7 Abrasive separator with elevator.
1—27" x 36" TUMBLAST, Skip Loader.
1—48" x 54" TUMBLAST.

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1—Type AECQ-16, 1000 A.
1—2500 A. automatic shaft.
7—Demagnetizers, 6 x 6 up to 24 x 24.
10—Inspection tables, type XTH3060.

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2—5 H.P. Vickers hydr. power units.
45—Hydr. cylinders.

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7—Precision Scientific Model 124 & 815.
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1—12 KW Steiner-Ives.

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(Paint & Spray Degreasers)
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75—Spray booth duct type exhaust fans, 18" to 54".
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1—7050EHE American.
4—American motor driven 26-175.
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6—McKee gas boosters.
2—North Amer. high pressure blowers.
2—#4RE Buffalo high pressure blowers.

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7—Deming 1" x 2" centrifugal pumps.
60—Aurora & Amer. Marsh condensation return units 6000 and 15,000 sq. ft. radiation.
6—Roper Model 2F20 & 26F20.
1—Roper figure 3600 MA3.
6—Westco.
3—#7W Beach-Russ wet vacuum pumps, 110 Cfm.

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4—Sharples commercial super centrifuges, portable.
2—4C Bowser cont. filter tanks.
2—Olson filter units.
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2—Lincoln pile drivers.

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3—20 KW Chand. 500 A. 40 V. synch. 900 RPM.
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6—Battery charging rectifiers, 13½ V., 35 A.

TRANSFORMERS
17—100 KVA West. 3 ph. insulated dry-type, 440 V. prim. 220 V. sec.

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2—#3D Gardner polishing lathes.
6—Blount polishing lathes, B1-2 & 3.
1—Schauer Model VA3B.

DEEP FREEZE UNITS
10—Kold-Hold.
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(material handling equipment)
1—2 ton 26' 8¼" span Harnisch.
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1—1000# Barrett-Craven shop crane.
140 ft.—20" power roller conveyor.
600 ft.—20" gravity roller conveyor.
2—Variable speed reduction gear conveyor drives.

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2—Commander portable gas. floor sweepers.

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1—15000 V. Delco ignition tester.
1—Denison magneto tester.

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3—High pressure Jennys.
1—Howe counting scale.
1—Thomas Tap Extractor.
2—#1 Springfield straightening presses.
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No. 49 New Britain 4 spdl. shucker
Model A 2½" Cleveland (1943)
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42" Bullard
60" Colburn
84" Betts

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No. D-8 Colburn
No. 4 BL Natco—36 Spdls.
6'-17" Foodick Hyd. Economax Radial
7'-15" American Univ. Radial

GEAR MACHINERY
No. 7123 Fellows Gear Shaper
No. 71Z Fellows Auto. Indexing (1942)
No. 18-H Gould & Eberhardt
12" Gleason Bevel Gear Generator
72" Cincinnati Gear Cutter

GRINDERS
4"x12" Landis, Model H (1942)
6"x18" Norton Type C Plain (1943)
8"x36" Norton Type C Plain (1943)
10"x18" Norton Type C Plain (1943)
10"x48" Norton Type C Plain
Norton Motorized Grinders Sizes Ranging from 6"x32"—— to ——24"x240"
No. 5 Covel Hydraulic Surf. (1941)
No. 34 Abrasive Surf. (1943)
No. 36-A Hanchett
72A-3 Heald Internal Gdr. (1943)
72A-5 Heald Internal Grinder (1942)
No. 5 Bryant Internal Grinder
No. 16—38" Bryant Internal (1942)
No. 24—26" Bryant Internal (1942)

HORIZONTAL BORERS
No. 31 Lucas 3" Bar
No. 46B Heald
No. 112-C Excello

LATHES
18"x54" Centers LeBlond
16"x60" Centers Pratt & Whitney
18"x8' American
19"-38"x10' gap LeBlond
36"x30' Lodge & Shipley
36"-48"x16' Lehman Hydrotrol (1945)
48"x20' Simmons (1942)
50"x17' Centers LeBlond (1942)
8"x15" Sundstrand (1942)
10"x22" Sundstrand, Model AA (1943)
16"x33" Fay Automatic (1942)
20"x25" Fay Automatics (1942)
R-14 Seneca Falls Le-Swing

MILLING MACHINES
No. 4 Cincinnati Plain (1943)
No. 2H Milwaukee Vert. (1942)
No. 2 Cincinnati Vert. (1942)
No. 2M Cincinnati Vert. (1941)
No. 3 Cincinnati High Power Vert.
No. M-24 Milwaukee Simplex (1942)
No. 1-16 Cinn. Mfg. (1940)
No. 2-18 Sundstrand Electromil (1942)
No. 4-48 Cinn. Plain Hydromatic (1942)
No. 34-48 Cinn. Hyd. Duplex
No. 45-48 Cinn. Plain Hyd. Tracer (1942)
4"x9" Hansen-Whitney Thread Miller
4½"x12" Pratt & Whitney, Model C
6"x36" Lees-Bradner Thrd. Miller (1942)
6"x132" Pratt & Whitney Thrd. Miller
24"x24"x12' Ingersoll Adj. Rail
36"x36"x18' Ingersoll Adj. Rail, 4 hds.
72"x8' Ingersoll Face Miller

PLANERS
36"x36"x12' Cincinnati
36"x36"x18' Gray
48"x36"x14' Gray
48"x48"x12' Cincinnati

TURRET LATHES
No. 4 Gisholt (1942)
No. 5 Warner & Swasey (1942)
No. 5 Bardons & Oliver (1942)
No. 5 Midland, bar feed
No. 2A Warner & Swasey
No. 1-H Libby, 6¼ Spdl. Hole
No. 4A Warner & Swasey, 7½" spdl. Hole

MISCELLANEOUS
18" Dill Slotter
Model H-7 Micromatic Hone
Model 200 Micromatic Hone

"Ask For Complete List"

HILL-CLARKE
MACHINERY CO
647 Washington Blvd. - Chicago

LATEST TYPE NEARLY NEW MACHINES

BORING MILLS—Horizontal
CINCINNATI GILBERT 3½" bar, floor type, latest
DETRICK & HARVEY 4" bar, Floor Type, M.D.
EXCELLO #113-B Single End Borematic, Latest
FRANKLIN 4¼" Bar Table Type—M.D.
GIDDINGS & LEWIS #25, 2½" bar, M.D.
GIDDINGS & LEWIS #25T, 2½" bar, Latest Type
HEALD 48, 49 single end, Borematic, Latest
LANDIS—#35—3½" bar, floor type, M.D.
LUCAS #41, 3" bar, Table Type, Latest Type
NILES BEMENT POND 5" bar, floor type M.D.
NILES BEMENT POND 8" bar, Floor Type, M.D.
UNIVERSAL 3" bar, high speed, latest type

BORING MILLS—Vertical
BETTS 120", 2 swivel heads, AC, Motor Drive
BULLARD 16" 6-spindle Mult-Au-Matic Type D, Latest
BULLARD 12" 6-spindle Mult-Au-Matic Type D, Latest
BULLARD 8" 8-spindle Type J Mult-Au-Matic, Latest
BULLARD 24", 36" Vert. Turret "New Era" Side Head, M.D.
BULLARD 24", 36", 42" Vert. Turret "Spiral Drive" Latest
BULLARD 61" "Maxi-Miller," 2 heads, Motor Drive
COLBURN 72", 2 swivel heads, PRT, M.D.
KING 62", 2 swivel heads, PRT, M.D.
NILES 100", 2 swivel heads, Rapid Traverse, AC,M.D.
NILES 100", 2 swivel heads, 126" height under toolholders, M.D.

BRAKES—Power
CINCINNATI Series 300, ⅛" x 8'6", M.D.
CINCINNATI Series 50, 3/16" x 8', Latest Type
CINCINNATI Series 50, ¼" x 6', Latest Type
VERSON #266, 10 gauge x 96", Latest Type

BROACHES
AMERICAN V-2, 6 ton Hyd., Latest Type
CINCINNATI 1-30, 3-30, Duplex Vertical Surface, Hyd., Double Ram, Model ER, Latest Type
LaPOINTE 5-36 Vertical, Hyd., Latest Type

DRILLS—Miscellaneous
AVEY MA-8, 2 spdles., Latest Type
AVEY MA-6, 3 spdles., Latest Type
BARNES H-3 Hydram. Hyd., Latest Type
CINCINNATI BICKFORD 24" Box Column, Latest
EDLUND 1B, 2B, 2MS, Latest Type
FOSDICK #4BM, 3 Spindle, Latest Type
FOOTE-BURT #2, #3, Motor Drive
HIGH SPEED HAMMER R-53, Latest
LELAND & GIFFORD #2LMS, 6 Spindle, Latest Type
LELAND & GIFFORD #1 LMS, 4 Spindle, Latest Type
LELAND & GIFFORD #2, #2MS, Single Spdle.

DRILLS—Deep Hole
BARNES 420/2 Spindle Hydraulic, Latest Type
BAUSH #1¼x30 2 Spindle, Latest Type
LeBLOND #3 Single Spindle, Hydraulic, Latest Type
PRATT & WHITNEY #1Bx50", Hyd., Latest Type

DRILLS—Multiple Spindle
BOLEY 10 spdles. ⅜" cap. High Speed, Latest
BROWN & SHARPE #13 Spur & Bevel Cutter, M.D.
CROSS #1 Tooth Rounder, M.D.
FOOTE BURT 20 spindles Hyd., Latest
GLEASON #14 Hypoid Grinder, Latest
NATCO #4AL, 30 Spindles, Hyd., Latest Type

DRILLS—Radial
AMERICAN 4' arm 11" col. "Hole Wizard," Latest
AMERICAN 4' plain Triple Purpose, Motor Drive
AMERICAN 5' arm 13" column Plain, M.D.
CINCINNATI BICKFORD 5' 13" Column, Plain, M.D.
CIN. BICKFORD 6' arm 15 col. Plain or Univ., M.D.
DRESES 4' arm 13" column Plain, M.D.
DRESES 5' arm 15" column Univ., M.D.
NILES 6' arm 15" column Univ., M.D.
WESTERN 6' arm 20" column Plain, Latest Type

GEAR CUTTING EQUIPMENT
BARBER COLMAN Type S hobber, latest type
BARBER COLMAN #12 Hobber, Single and Double Overarm, Motor Drive
BROWN & SHARPE 6-60 Gear Cutter, Motor Drive
FELLOWS #61A, #61, #7A, #72, #75, #7, #77 High Speed Gear Shapers, latest type
FELLOWS #12M Involute Measuring Instrument, latest
FELLOWS #Z, #6Z2 Gear Shaper, high speed, latest
FELLOWS #13LS Lapper, latest type
FELLOWS 8M Red Liner, Latest Type
GLEASON 3", 12" straight bevel generator, Latest Type
GLEASON 11", 18" Straight Bevel Generator, M.D.
GLEASON #4, #6, #13, #18 Bevel and Hypoid Tester
GOULD & EBERHARDT #36 H Hobber M.D.
GOULD & EBERHARDT 12H Hobber, Latest Type
GOULD & EBERHARDT 12HS Hobber, Latest Type
GOULD & EBERHARDT 96H Hobber, with diff. M.D.
KOEPFER Model WM11 automatic hobber—latest
PRATT & WHITNEY 10" Grinder, hyd., latest
SYKES #1¼ 18" Cap. Herringbone Gears, M.D.

GRINDERS—Cyl.—Plain & Univ.
BROWN & SHARPE #1, 2, 3, 4, Universal, Latest
BROWN & SHARPE #5 Plain, 3 x 12, Latest Type
LANDIS 4x12, Type H, Plain Hyd., Latest Type
LANDIS 6"x18" Type C Plain, Hyd., Latest Type
NORTON 6"x18", 6"x30", 14"x36" Type C, Plain, Hyd., Latest Type
NORTON 10" x 72" Type C, Plain, Mech., Latest

GRINDERS—Miscellaneous
BARBER COLMAN #3 #4 Hob Sharpener, Latest
BROWN & SHARPE No. 13 Univ. Cutter & Tool, Latest
BRYANT #16-CP-16, #24 Internal Hyd., latest type
CINCINNATI #2 Centerless "Filmatic," latest
CINCINNATI "Monoset" Tool & Cutter, Latest
GARDNER 24-53" Disc Grinder, Latest
HEALD #72A3 Sizematic, Motor Drive
COVEL #22 Universal Tool & Cutter, Latest Type
EXCELLO #46C Carbide, Latest
FITCHBURG 14"x25" Spline, hydraulic, latest
GLEASON 12" Spiral, Bevel Sharpener, M.D.
GLEASON #12 tool sharpener, Latest Type
HEALD 72A3, 72A5 "Gagematic," Internal, Latest
HEALD 75A, 72A3, 72A5, 74, 70A Internal, latest
JONES & LAMSON 6x15, 8x18 Auto Thread, latest
LANDIS 5" oscillating, external, M.D.
LANDIS #6, 6x24 Thread, latest type
LANDIS #12 Centerless, Hydraulic, Latest Type
THOMPSON 6"x48" Auto., round broach, M.D.
VAN NORMAN #73, 639, Osc. Radius, Latest

GRINDERS—Surface
BLANCHARD #16, 24" chuck, Motor Drive
BLANCHARD #11, 16", Latest Type
BROWN & SHARPE #5, 8"x24" Hyd., Latest
DO-ALL Model G-7, 9"x20", Hyd., Latest Type
HANCHETT Series 300 13"x48" Vert. Hyd., Latest
HEALD #22 Rotary, 12" chuck, latest type
HEALD 25A—rotary—16" and 30" chuck, hyd., Latest
NORTON 6x18 Hydraulic, latest type
THOMPSON 12x12x24 Type D Hyd., Latest Type

JIG BORERS
FOSDICK #42, "Precision", Latest Type, New 1947
KEARNEY & TRECKER Model B, Autometric, Latest
PRATT & WHITNEY 1A, Motor Drive
VERNON, Precision, Latest Type

LATHES—Engine and Mfg.
AMERICAN 36"x360" centers, 2 carriages, motor drive
BRIDGEFORD 36"x32' bed—2 carriages, M.D.
HENDEY 12x54" centers, M.D.
HENDEY 12x30", 14x30", Timken, Latest Type
JONES & LAMSON "Fay" 20x25" automatic, latest
KEIGHLEY LIFTS 8/16x26" Centers gap, Latest
LeBLOND 21"x66" Centers, Geared, Motor Drive
LeBLOND 13"x5' "Regal", Timken, latest
LEBLOND 20"x40" centers, geared, motor drive
LEHMANN 16x30" centers, TIMKEN, latest type
LODGE & SHIPLEY 12"x54", 16"x30", 14"x30" Centers, Type C, Timken, Latest Type
LODGE & SHIPLEY 18x72 centers, M.D.
LoSWING 4x80, 4x84, 8x60, 8x108, 5x34, Latest
MEDART #6LNF Bar Turner, 1" to 6" Cap., Latest Type
MICHIGAN #1712 Univ. Relieving, Latest
MONARCH 10"x20" centers, Model EE, Timken, latest
MONARCH 12"x30" Centers Model CKK, Timken, latest
MONARCH 12"x54" Centers Model CK, Timken, latest
MONARCH 16"x28" Centers, Geared Head, Motor Drive
MONARCH 16"x78" Centers Model CW, Latest
MONARCH 22"x456" Centers, 3 Carriages, Timken Bearing, Model CM, Motor Drive
MONARCH 24"x54" Ball Bearing, Geared Head, M.D.
NILES 30"x50' Boring "Time Saver" Timken, Latest
NILES 30"x100" Centers, D.C., Motor Drive
NILES 90"x110" centers, standard driving wheel, M.D.
PRATT & WHITNEY 16"x30" Centers, 14"x54" Centers, Model C, Timken Bearing, Latest Type
PRATT & WHITNEY 10"x20" centers Bench, latest
PUTNAM 42"x25' Centers, Motor Drive
REED PRENTICE 16x24" centers, geared head, M.D.
REED PRENTICE 20"x54" Centers Model A, Latest
SPRINGFIELD 14"x43", 16"x24" Centers, M.D.
SPRINGFIELD 16"x30' centers, Timken, latest type
U. S. TOOL #810-B Cutter Reliever, Latest
WARD, HAGGAS & SMITH—18/30x66" centers gap, motor drive, Latest Type

LATHES—Turret
BARDONS & OLIVER #5, #7, TIMKEN, Latest Type
CINCINNATI ACME No. 1 Timken, Latest
FOSTER #4FU "Fastermatic," Timken, Latest
GISHOLT #1L, #2L, #3L Universal, Timken, Latest
GISHOLT #3, #4, univ., TIMKEN, Latest type
JONES & LAMSON #3, #5, Univ. Timken, Latest
LIBBY "International" 1H5 Univ., Timken, Latest
MOREY No. 2G, No. 3, No. 4, Timken Bearing, latest
POTTER & JOHNSTON #5D, #5D2E, Timken, latest
WARNER & SWASEY 5, Universal, Timken Bearing
WARNER & SWASEY #3A Universal Motor Drive
WARNER & SWASEY #1, #2, Timken, Latest Type
WARNER & SWASEY #1A, Univ., Timken; M.D.
WARNER & SWASEY #2A Universal, Timken, Bar & Chucking, Latest Type
WARNER & SWASEY #3 Universal, Timken, Latest
WARNER & SWASEY No. 1A Univ. Timken Bearing, Serial over 1,000,000, NEW 1947

MILLING MACHINES—Mfg.
CINCINNATI 24", duplex, TIMKEN, M.D.
HALL Style D, Planetary, latest type
INGERSOLL 42"x38"x12' adj. rail, 4 heads, AC, M.D.
INGERSOLL 32x24x16' Planer Type, 2 heads, AC, M.D.
INGERSOLL 30x24x12' adj. rail slab, M.D.
SUNDSTRAND Model 3A Duplex 42" feed, Latest
TAYLOR & FENN M80 Duplex Spline, latest

MILLING MACHINES—Plain
BRIGGS Type A, Hyd., 12" Feed, Latest Type
BROWN & SHARPE #2, Light Type, Timken, Latest
BROWN & SHARPE #12, 24" feed, Latest
BROWN & SHARPE #000, Timken, Latest Type
BROWN & SHARPE #2B, 3B, Timken, Latest Type
CINCINNATI #4 TIMKEN, Motor Drive
CINCINNATI 08 Automatic Rise & Fall, Latest Type
CINCINNATI 1-12, 2-18 Automatic, Latest Type
CINCINNATI #3 #4, #5, High Power, Latest Type
CINCINNATI 24" automatic, TIMKEN, M.D.
CINCINNATI 4-36 Hydromatic, Simplex, Latest Type
KEARNEY & TRECKER #2H, 3H, 4H, Timken, latest
KEARNEY & TRECKER 1404 Simplex, Timken, Latest
KEARNEY & TRECKER 1218 Simplex, Timken, Latest
KEARNEY & TRECKER #3, 4, Heavy, Timken, M.D.
KEMPSMITH #4 Maximiller, Timken, latest type
KEMPSMITH #3G, Timken, Latest Type
Le BLOND No. 4, belted motor drive
SUNDSTRAND #3, Rigidmil, Timken, M.D.
U. S. Model MM-1-6, Automatic, Latest Type

MILLING MACHINES—Thread
HANSON & WHITNEY 4" x 9" centers, Latest Type
LEES BRADNER 12" x 54" Centers, Latest Type
MOREY 12 x 30", 60", 120", 190" centers, Latest
PRATT & WHITNEY 6" x 60" centers, Model C, Latest

MILLING MACHINES—Universal
AMES 2½"x19" Table, Latest Type
BROWN & SHARPE No. 2A, Timken Bearing, Latest
BROWN & SHARPE No. 2A, No. 3A, 4A, M.D.
HARDINGE Model UM, Timken, Latest
KEARNEY & TRECKER #2H, #3H, Timken, Latest
KEARNEY & TRECKER #2 Heavy, Timken, M.D.
KEMPSMITH #4 Maxi-miller, Timken, Latest
VAN NORMAN #3 duplex, Motor Drive
VAN NORMAN #12, #26, #36, Timken, Latest Type

MILLING MACHINES—Vertical
BROWN & SHARPE #2 Standard Timken, Latest
CINCINNATI #2, Dial Type; Timken; latest
CINCINNATI #08, TIMKEN, Latest Type
CLEVELAND #1 High Speed, Latest Type
GORTON 8½D, 9J Super-speed, Latest Type
KEARNEY & TRECKER 3H, Timken, Latest
MOREY 12M Single & Double Spindle Profiler, Latest
REED PRENTICE 3VG, with or without hydraulic duplicator, Timken bearing, Latest Type
SUNDSTRAND #3 Profile & Channel, Latest

PLANERS
CINCINNATI 30"x30"x8', 4 heads, PRT, DC, M.D.
CONSOLIDATED 86"x86"x16', 4 Heads, Box Table, PRT, DC, M.D., Latest Type
DETRICK & HARVEY 48"x48"x16'—4 heads, Hyd.
GRAY 36"x36"x8'—2 heads, Max. service, D.C. variable, Speed Motor Drive
NILES 48"x48"x12' "Time Saver" 3 Heads, Box Table DC Reversing, PRT, M.D., Latest Type
NILES 42"x42"x14' "Time Saver" Box Table, 3 Heads, PRT, VARI VOLTAGE Drive, Latest
NILES 48"x45"x14', 4 Heads, PRT, Box Table, DC, M.D.
NILES 48"x48"x16', 2 heads, A.C., M.D.
NILES 54"x54"x18'—4 heads, Box Table, D.C., M.D.
NILES 48"x48"x16'—3 heads, Box Table, A.C., M.D.
SELLERS 30' Plate Edge, Motor Drive
WOODWARD & POWELL 54"x54"x20', 4 hds., M.D.

PRESSES
BIRDSBORO 325 ton, vert. hyd., Latest Type
CHAMBERSBURG 50 ton, vert. hydro-pneumatic
CLEARING TYPE DS-1125-32 dbl. action 125 ton, latest
COLONIAL Model VJ, 2 Ton, Hyd., Latest
GLEASON 15" Quenching, Hyd., Motor Drive
HANNIFIN 15 ton molding, Latest Type
HENRY & WRIGHT 50 ton Dieing, Roll Feeds, M.D.
HPM 37-Ton Vertical Hydraulic, Latest Type
LAKE ERIE 500 ton Vert., Hyd., Latest Type
LUCAS 30 ton Forcing, Latest
METALWOOD #35A, 35 Ton, Latest Type
NILES 400 ton, Horiz. wheel, Motor Drive
WATSON & STILLMAN 20 ton hyd. Stgh., Latest

SCREW MACHINES—Automatic
BILLINGS & SPENCER #B2 Di-matic Cut Off
CLEVELAND 9/16" Model A, Latest Type
CONOMATIC 6"—4 spindle, Latest Type
CONOMATIC 2⅝"—9 spindle, Latest Type
GOSS & DeLEEUW 8" Automatic Chucker, 5 spindles

SHAPERS & SLOTTERS
AMERICAN 20" Heavy Duty, Motor Drive
CINCINNATI 24" Crank, M.D.
DILL 20"-24" Vertical Motor Drive
FELLOWS #2 Duplex Nut Slotter, Latest
GOULD & EBERHARDT 16", 20", 32" High Duty., M.D.
LAMAIRE 18" Vert. Hydraulic, Latest Type
LYND FARQUHAR 26" openside, M.D.
PRATT & WHITNEY 6" Vertical, M.D.
SMITH & MILLS 16" high speed, latest

SHEARS—Power
NIAGARA #3120, 10 gauge x 10', M.D.
WYSONG & MILES #572, 14 gauge x 6', Latest Type
QUICKWORK #5, ⅜" Cap., Rotary Shear, M.D.
QUICKWORK #6, 1" Cap., Rotary Shear, M.D.

MISCELLANEOUS
AJAX 2", 3½" Forging and Upsetting, M.D.
BAKER #5 Keyseater Motor Drive
BARNES #172, 306H, 307 Vertical Hone, Hydraulic, Self-Oiling, Latest Type
CAMPBELL #401 Abrasive Saw, Latest Type
CINCINNATI Centerless Lapper, Model ED, Latest
CLEVELAND 12"x16' centers—Cutter Reliever, M.D.
DE LAVAL #194 Coolant Clarifier, Latest
GROB G-8 20 Band Saw and Filer, Latest
HELLER 6" Cap. Cold Saw, Hyd., Latest Type
LANDIS 2" Double Spindle Bolt Threader, M.D.
LeBLOND #2 Barrell Lapper, Latest
MANVILLE 2E 7/16" Cap. SSSD, Ball Header M.D.
NAZEL #4B Pneumatic Hammer, M.D.
NORTON #2F 10U Vertical Lapper—Latest Type
PEERLESS 6"x6", 10"x10", 13"x13" Hack Saw, M.D.
PRATT & WHITNEY (KELLER) Type BL-2416 Copying, latest type, 2 & 3 Dimensional
PRATT & WHITNEY (KELLER) Type G Copying; latest type 2 Dimensional
PRATT & WHITNEY ⅛Bx50 Rifler, Latest Type
REED #20 Thread Roller, Latest Type
ROWBOTTOM Cam Miller, Motor Drive
STOEVER 4"-12" Pipe Threader, M.D.

Available for Prompt Shipment ***Most Built After 1941***

(Partial List) Over 2,000 Machine Tools In Stock. Your Inquiries Are Invited . . . Prompt Service Is Assured

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BROOME & LAFAYETTE STS., NEW YORK 13, N. Y.
TELEPHONE: CANAL 6-5360
CABLE ADDRESS: WOODWORK, N. Y.

AUTOMATICS

No. 16 New Britain 6 spdl. Chucker
8" Bullard 6 station Multaumatic
No. 454 New Britain chucker
14" x 19" Fay chucker
No. 2 FU Foster Fastermatic
2⅝" Acme Gridley model RA6
2" x 18" Cleveland model B
1⅞" Conomatic 8 spindle
1⅝" New Britain model 61
1 1/16" Cleveland "M" 4 spindle
⅞" & 1¼" Cone 4 spindle
½", No. OG Brown & Sharpe
9/16" Acme Gridley model R6
1" Economy bolt shaver

BROACHES

3 ton American vertical
30 ton (48" str.) American vert.
No. 1 Foote Burt duplex surface
9 ton American horiz. surface
No. 3XA Oilgear
Twin Ten Oilgear duplex

DRILLS

Nos. 121, 217, 315 & 513 Baker
No. 30HO Baker 2 spdl. inverted
No. 217 Baker 3 spindle
20" Cint. Bick. Super Service
21" & 24" Cint. Bick. Upright
3' Morris radial
4' Cint. Bick. univ. radial
6' Dreses radial
7' American radial
24 spdl. No. 84A Natco multiple
16 spdl. No. 82L Natco multiple
36 spdl. No. W6 Baush multiple

GEAR CUTTERS

Nos. 8H, 12H, 16HS & 18H G & E
Nos. 3, 12 & Model T Barber Colman
Nos. 1, 5A & 5AC Lees Bradner
No. 5M Adams Mfg. hobber
No. 61 Fellows gear shaper
12" Red Ring gear shaver
18" Gleason testers & lappers

GRINDERS

24" x 36" Springfield surface
14" x 36" Pratt & Whitney surface
No. 10 Blanchard surface
No. 2 Cincinnati centerless
6" x 18" No. 10 Brown & Sharpe
10" x 24" Landis hydr. univ.
No. 2 Norton univ. T. & C.
53", No. 372 Besly horiz. disc
30", No. 230 Hanchett opposed disc
15", No. 115 Gardner opposed disc
No. 72A Heald Sizematic internal
No. 16A 16 & 24-36 Bryant internal

MILLS, BORING

2½" No. 25 Giddings & Lewis
3" No. 31 Lucas
3" No. 3A Universal
3¾" No. 32 Lucas
3¾" No. 5A Defiance
5" Jones, planer table type
24" & 42" Bullard vertical
52" King vertical
100" Niles Bement Pond vert

MILLERS

Nos. 2AS, 2, 3B & 4B Milwaukee
No. 3 Cincinnati universal
Nos. 2M & 2 Cincinnati vertical
No. 2H & 3H K. & T. vertical
Nos. 1H, M18, M24 & 12-24 K. & T. Mfg.
Nos. 1-12, 1-18, 2-18 & 2-24 Cincinnati
No. 08 Cint., plain, vert., rise & fall
Cincinnati Hydromatic Nos. 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 & 56-90
No. 3-36 Cincinnati duplex
30", 42" & 84" Ingersoll rotary
24" x 24" x 16' Ingersoll adj. rail
Nos. 1M, 2 & 3 Kent Owens hand
No. 12 Brown & Sharpe Mfg.
Nos. 4, 40 & CT36 Lees Bradner thread
Types C & D Hall planetary
No. 12B Pratt & Whitney profiler
Vernon jig borer
No. 2 Pratt & Whitney jig borer

MILES MACHINERY CO.
SAGINAW, MICH.

D. & K. Press Brake, 10' 10 ga.
Verson Press Brake, Ram 78", Cap. 33-ton
Kling Double Angle Shear Cap. 6x6x1"
National High Duty Upsetting & Forging Machines, guided overarm heading slide, susp. slide 3", 5", 6"
Ajax Upsetting & Forging Machines, susp. slide 1¼", 2½"
Acme Upsetting & Forging Machine, susp. slide, 1½"
Ajax & Acme Upsetting & Forg. Machs. not susp. slide, ¾", 1", 1½", 2½", 3"
Williams White Bulldozers #23, #4
Drop Hammers 800, 1000, 1200, 1500, 2500#
Trimming Presses #59¼ Toledo Tie Rod; other trimmers 55 to 200-tons
Open Back Incl. Presses 8 to 60-tons
Solid Back Presses 20 to 50-tons
#94-A Toledo S.S. Double Crank Tie Rod Press, Bolster 40x36"
Bliss Knuckle Joint Press 250-tons
Nazel Air Forg. Hammer #6-B, Cap. 7" sq.
Bradley Hammers, Cushioned Helve, Upright & Compact
Single and Double End Punches, wide variety caps. & throat depths
Geo. Ohl Squaring Shear, Cap. 10', ¼"
Ryerson Serpentine Throatless Shear ½"
Bending Rolls 8'-⅜", 13'-⅝"
Niles Plate Leveller 60"x½"
Landis Threading Mach. 1" two spin., lead screw, Lanco Hds., single up to 4"

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#1—18 Cincinnati Prod. Miller, 1942
#3—24 Cincinnati Hydra. Miller, 1941
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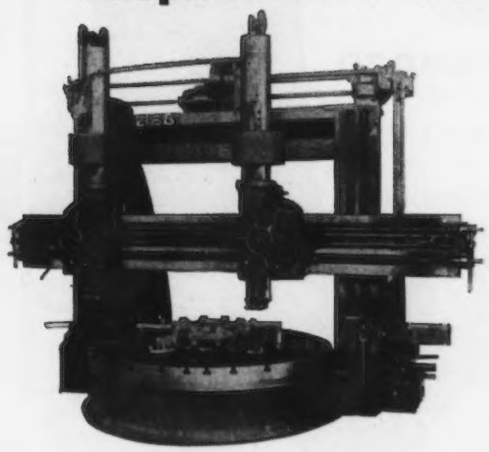

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No. 2A WARNER & SWASEY, bar feed, taper attach., threading attach., tooling, 1942
No. 2A WARNER & SWASEY, bar feed, 4' extra bed length, taper attach., steady rest, 1941
24" GOULD & EBERHARDT "Industrial" Shaper, 1942
5'-15" col. AMERICAN "Holewizard" Radial, box table, 1942
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1—48"x48"x14'0" Gray Planer-Type Milling Machine
2—112" Widened to 14' Betts Heavy Duty Vertical Boring Mills
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1—#4 Standard Kane & Roach 8-Roll Straightener
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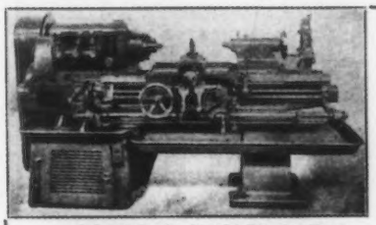

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Lodge & Shipley 14"x30" 12-speed Selective Head Engine Lathe, M.D. in Base, Back Slide, Actual swing 16½"—Standard Equipment—Exc. Condition

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AMERICAN 4'8" Col. Motor on Arm Radial
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LODGE & SHIPLEY 14"x30" Sel. Head Engine
MONARCH CAA 16"x54" Engine
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K&T #2HL Plain
K&T #2K Plain
K&T #2K Vertical, Pr. Feed to Hd.
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1	10	Shaw Box	40'0"	440-VAC.
1	7½	Erie	64'6"	440-VAC.
1	5	Northern	57'0"	220-VAC.
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1	5	Valls	40'0"	440-VAC.
1	5	Whiting	29'9"	230-VDC.
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SQUIRREL CAGE MOTORS
3-PHASE, 60-CYCLE

Qu.	H.P.	Make	Type	Volts	RPM.
1	400	G.E.	KT-412	2300	450
1	300	Al. Ch.	AR	440	500
1	250	Whse.	CS	2200	1160
1	200	Al. Ch.	AR	220/440	580
1	150	Mt. Mchy.	IC	220	1200
1	150	Whse.	CS-772	2200	1170
1	150	G.E.	L-K	440	730
1	150	Cr. Wh.		440	600
1	125	Whse.	C.S.-761	440	1750
1	125	Whse.	C.S.-772	2200	1170
2	125	Al. Ch.	AR	440	435
3	100	Whse.	CS-668	440	1750
1	100	Al. Ch.	AR-226	2200	1160
5	100	F.M.	HS-201C	440	850
2	100	G.E.	KT-556	2200	865
1	100	Al. Ch.	AR	550	690
1	100	F.M.	H-241-B	440	433
1	75	Al. Ch.	AR	2200	1745
1	75	Whse.	CS	440	1750
1	75	G.E.	KF-542	440	1200
1	75	Burke	EM-10	550	720
1	50	Ideal	AT-445	440	1750
1	50	Al. Ch.	AR-220D	440	1150
3	50	Whse.	CS	440	690

SLIP RING MOTORS—CONSTANT DUTY
3-PHASE, 60-CYCLE

Qu.	H.P.	Make	Type	Volts	RPM.
2**	3000	G.E.	I.M.	2200	120
1**	1200	Whse.	C.W.	2200	590
1	800	G.E.	MT-12	2200/6600	600
1**	600	G.E.	MT-412-Y	2200	719
1	500	G.E.	I.M.	2300	600
1	500	G.E.	I.M.	550	600
1	500	Whse.	C.W.	440	600
1	400	G.E.	I.M.	2300	875
1**	400	Al. Ch.	ANY	2300	514
1	400	G.E.	MT-422	2300	300
1	300	G.E.	I.M.	2200	1200
1	300	Al. Ch.	ANY	2200	505
1	275	Whse.	H.F.	440	345
1***	250	G.E.	M.T.	2300	600
1	250	Whse.	C.W.-1106	2200	600
1	200	Al. Ch.	ARY	2200	585
1	160	Whse.	C.W.	220/440	690
1	150	G.E.	I.M.	2200	1750
1	150	G.E.	I.M.	440	1180
1	125	Al. Ch.	ARY	440	900
1	75	G.E.	I.M.	220/440	695
2	50	G.E.	MT-536	2200	1150

***—3-bearing
**—MILL Type 2-pedestal bearing.

MOTOR GENERATOR SETS
3-PHASE, 60-CYCLE

Qu.	KW	Make	RPM.	Volts D.C.	Volts A.C.
1	1000	G.E.	514	600	4160/2300
1	750	Al. Ch.	720	250	440
1	750	G.E.	514	275/300	4160/2300
1	600	G.E.	720	300	2300/440
1	400	Whse.	710	550	2200
1	300	G.E.	720	250	2200/440
1	200	Burke	720	250	2200/440
1	100	Reliance	1200	275	440
1	100	G.E.	1200	250	2300/440
1	100	Cr. Wh.	720	250	2300/440
2	94	G.E.	1200	62.5	440/220
1	75	Al. Ch.	900	250	2300
1	75	Whse.	1200	120	440/220
1	50	Lo. Al.	1200	120/240	2200/440
2	35	G.E.	1800	125	440/220
1	25	Whse.	1200	120/240	440/220
6	25	Whse.	1200	120/240	440/220
1	15	Al. Ch.	1200	250	440/220
1	9	G.E.	1750	250	440/220

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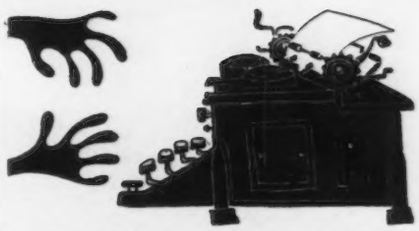

DEAR CUSTOMER

• **OLD FIREHORSE** — All the old saws about the retired firehorse will certainly be applied to the career of the new editor of IRON AGE, Tom Campbell. Veteran of eight years as Pittsburgh editor of IRON AGE, he has lived through some of the most exciting history of the steel industry. His connection with the many phases of that history has been so intimate at times that he feels he has lived it himself.

Life around Mr. Campbell is lived at a fast pace. His favorite offensive weapon in all his journalistic duels is the telephone. Any picture of him would be incomplete without that double-ended rapier in hand. He has been subjected to so many terse "no comments" in his day that he no longer needs to get a statement for a hot scoop in the industry. When there is a hot story in the air in Pittsburgh, Campbell can tell it by the way the wind is whipping through 42nd St. and Park Avenue here in New York.

For his colleagues he has always been a pitiless tyrant, but a strange one. His technique was simple. No district editor ever worked under him without the disquieting knowledge that a dissatisfied Campbell might blow into town and any moment do the story himself. No harsh words of criticism ever came with this performance, only the worrisome fear that the boss might steal the story. That is as far as his criticism of news coverage ever went.

New dignity with a new position, we predict, will not change him much. If the steel price situation becomes a matter of paramount interest, or if steel labor threatens a serious strike, Campbell will still have the long distance telephone lines humming. His intimate knowledge of the whole metalworking industry, along with some unique glandular condition that is pouring an extra plus value of energy into his blood stream, makes him an outstanding editor.

The only change we know for sure is that instead of finding himself on the Pennsylvania's crack Pittsburgher or Iron City two nights a week, he is apt to find himself on the road even more frequently.—J. H.

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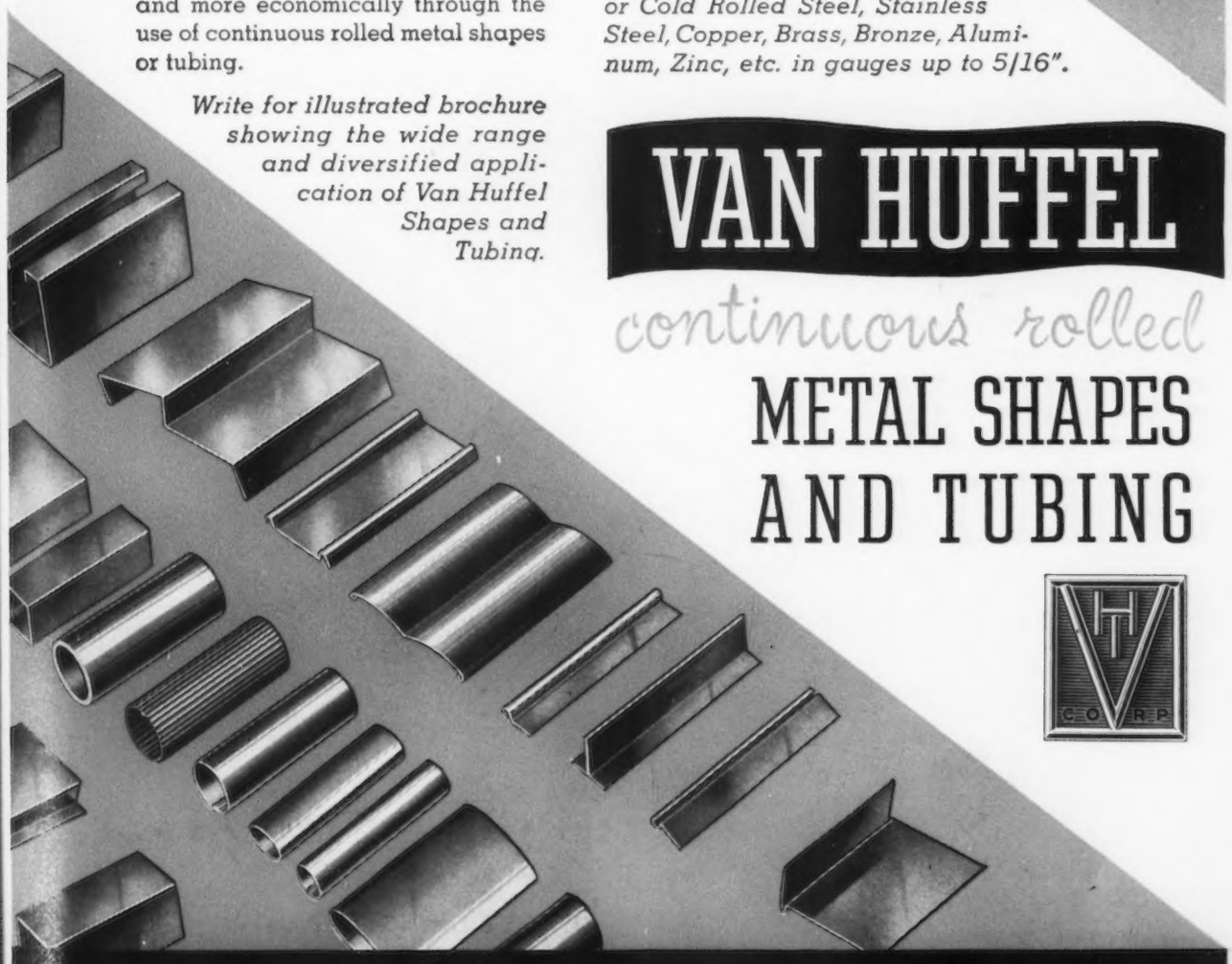

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